HITACHI

PM | NO. 0081E

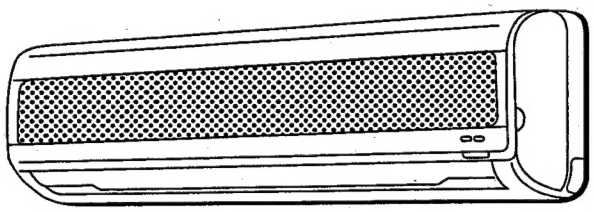
SERVICE MANUAL

TECHNICAL INFORMATION

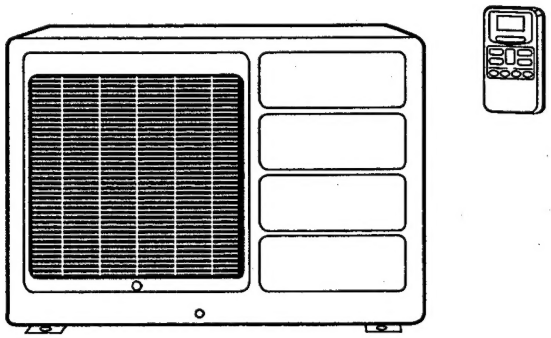
RAS-25CNH2
RAC-25CNH2

FOR SERVICE PERSONNEL ONLY

REFER TO THE FOUNDATION MANUAL



RAS-25CNH2



RAC-25CNH2

CONTENTS

SPECIFICATIONS

TYPE		WALL TYPE	
		INDOOR UNIT	OUTDOOR UNIT
MODEL		RAS-25CNH2	RAC-25CNH2
POWER SOURCE		1ø 220V – 240V 50Hz	
TOTAL INPUT	(W)	910 (190 ∿ 1,150) [COOL] / 1,250 (160 ∿ 1,350) [HEAT]	
TOTAL AMPERES (RATED / MAX.)	(A)	4.20 ∿ 3.85 [COOL] / 5.75 ∿ 5.25 [HEAT]	
COOLING CAPACITY	(kW)	2.50 (0.90 ∿ 2.80)	
	(B.T.U./h)	8,870 (3,070 ∿ 9,550)	
HEATING CAPACITY	(kW)	3.60 (0.90 ∿ 4.00)	
	(B.T.U./h)	12,280 (3,070 ∿ 13,650)	
DIMENSIONS (mm)	W	744	700
	H	248	570
	D	168	210
NET WEIGHT	(kg)	5.5	29

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

ROOM AIR CONDITIONER

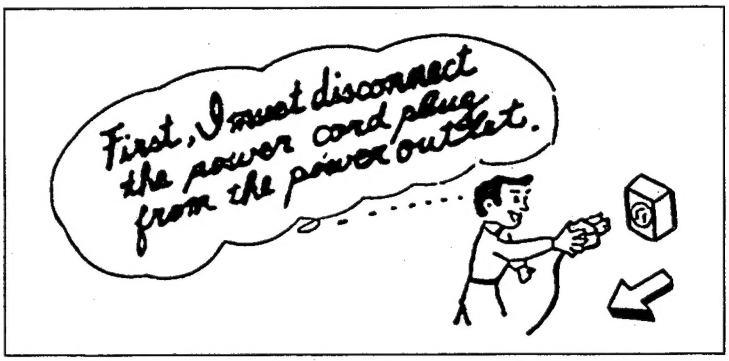
INDOOR UNIT + OUTDOOR UNIT

APRIL 1998

H.A.P.M.

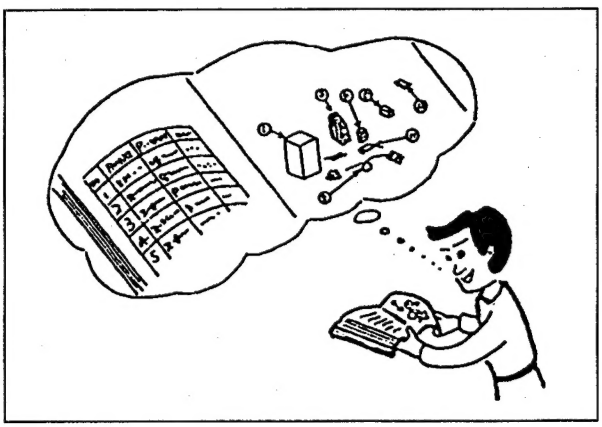
SAFETY DURING REPAIR WORK

1. In order to disassemble and repair the unit in question, be sure to disconnect the power cord plug from the power outlet before starting the work.

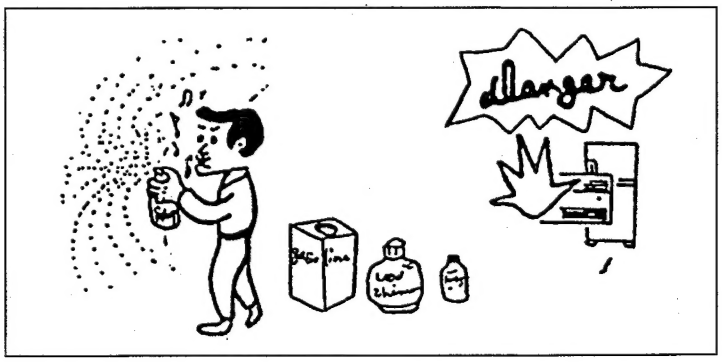


2. If it is necessary to replace any parts, they should be replaced with respective genuine parts for the unit, and the replacement must be effected in correct manner according to the instructions in the Service Manual of the unit.

> If the contacts of electrical parts are defective, replace the electrical parts without trying to repair them.



3. After completion of repairs, the initial state should be restored.
4. Lead wires should be connected and laid as in the initial state.
5. Modification of the unit by user himself should absolutely be prohibited.
6. Tools and measuring instruments for use in repairs or inspection should be accurately calibrated in advance.
7. In installing the unit having been repaired, be careful to prevent the occurence of any accident such as electrical shock, leak of current, or bodily injury due to the drop of any part.
8. To check the insulation of the unit, measure the insulation resistance between the power cord plug and grounding terminal of the unit. The insulation resistance should be 1MΩ or more as measured by a 500V DC megger.
9. The initial location of installation such as window, floor or the other should be checked for being and safe enough to support the repaired unit again.
   If it is found not so strong and safe, the unit should be installed at the initial location reinforced or at a new location.
10. Any inflammable thing should never be placed about the location of installation.
11. Check the grounding to see whether it is proper or not, and if it is found improper, connect the grounding terminal to the earth.



WORKING STANDARDS FOR PREVENTING BREAKAGE OF SEMICONDUCTORS

1. Scope
   The standards provide for items to be generally observed in carrying and handling semiconductors in relative manufacturers during maintenance and handling thereof. (They apply the same to handling of abnormal goods such as rejected goods being returned).

2. Object parts

   (1) Micro computer
   (2) Integrated circuits (IC)
   (3) Field-effect transistors (FET)
   (4) P.C. boards or the like on which the parts mentioned in (1) and (2) of this paragraph are equipped.

3. Items to be observed in handling

   (1) Use a conductive container for carrying and storing of parts. (Even rejected goods should be handled in the same way).

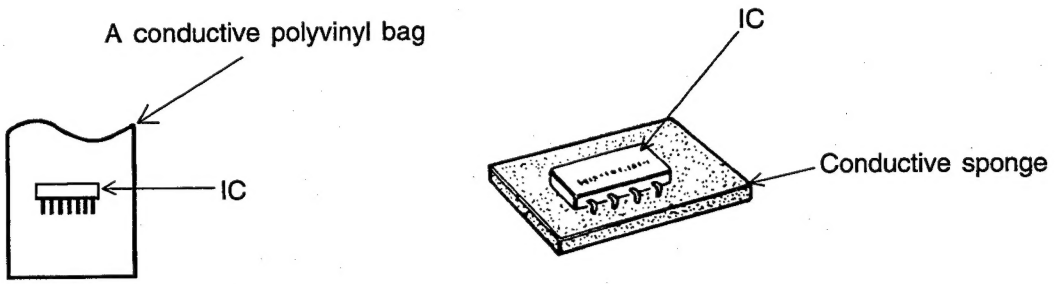


Fig. 1. Conductive Container

   (2) When any part is handled uncovered (in counting, packing and the like), the handling person must always use himself as a body earth. (Make yourself a body earth by passing one M ohm earth resistance through a ring or bracelet).

   (3) Be careful not to touch the parts with your clothing when you hold a part even if a body earth is being taken.

   (4) Be sure to place a part on a metal plate with grounding.

   (5) Be careful not to fail to turn off power when you repair the printed circuit board. At the same time, try to repair the printed circuit board on a grounded metal plate.

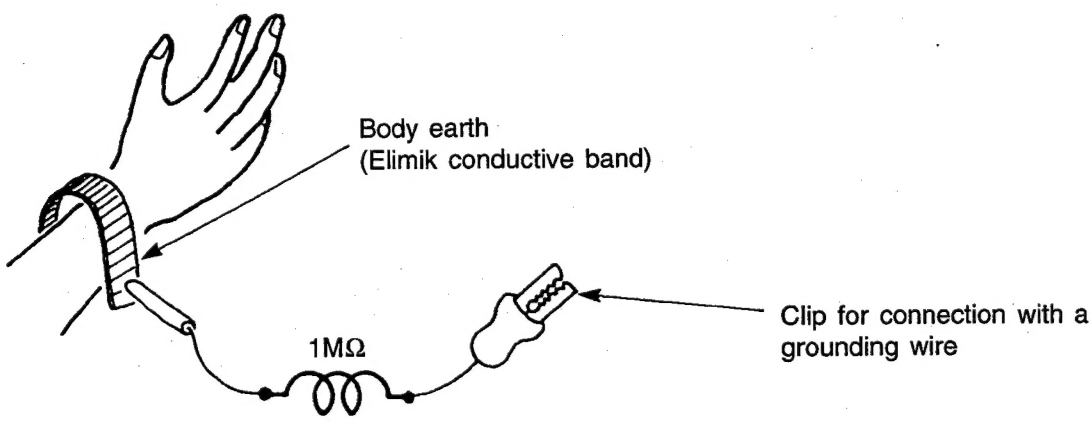


Fig. 2. Body Earth

(6) Use a three wire type soldering iron including a grounding wire.

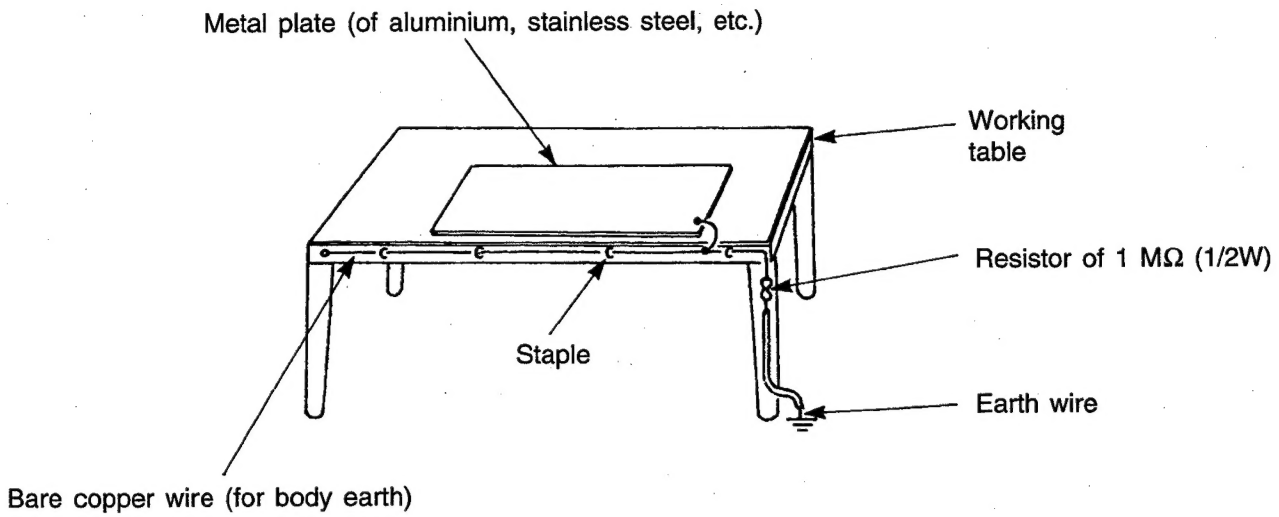


Fig. 3. Grounding of the working table

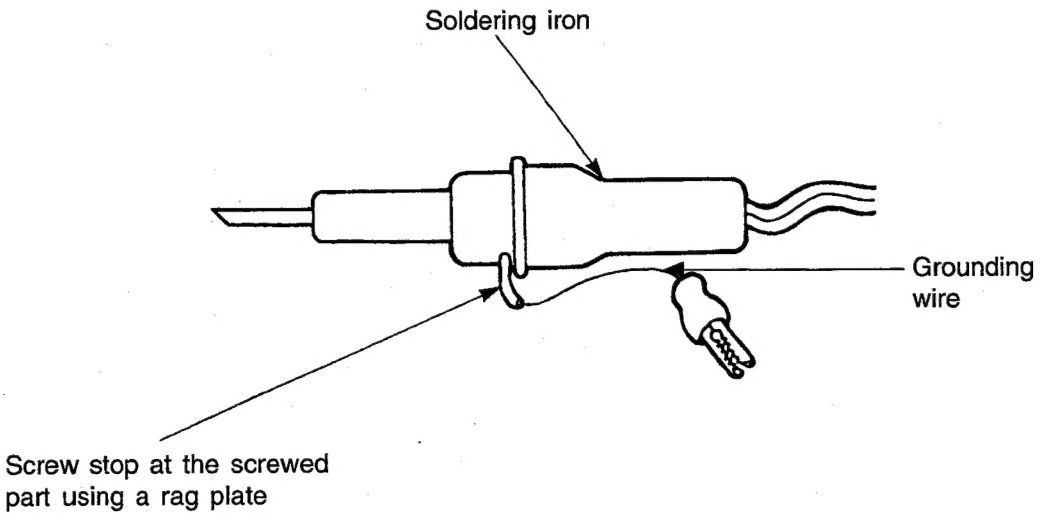


Fig. 4. Grounding a soldering iron

Use a high insulation mode (100V, 10MΩ or higher) when ordinary iron is to be used.

(7) In checking circuits for maintenance, inspection or some others, be careful not to have the test probes of the measuring instrument shortcircuit a load circuit or the like.

⚠ CAUTION

1. In quiet operation or stopping the running, slight flowing noise of refrigerant in the refrigerating cycle is heard occasionally, but this noise is not abnormal for the operation.

2. When it thunders near by, it is recommend to stop the operation and to disconnect the power cord plug from the power outlet for safety.

3. If the room air conditioner is stopped by setting the temperature or mis-operation, and then re-started in a moment, cooling operation does not start for 3 minutes, it is not abnormal and this is the result of the operation of IC delay circuit. This IC delay circuit ensures that there is no danger of blowing fuse or damaging parts even if operation is restarted accidentally.

4. This room air conditioner should not be used at the cooling operation when the outside temperature is below 20°C.

5. When the operation knob is set to "COOL" from another position, IC delay circuit functions and stops the compressor for the first 3 minutes, which is not an abnormal phenomenon.

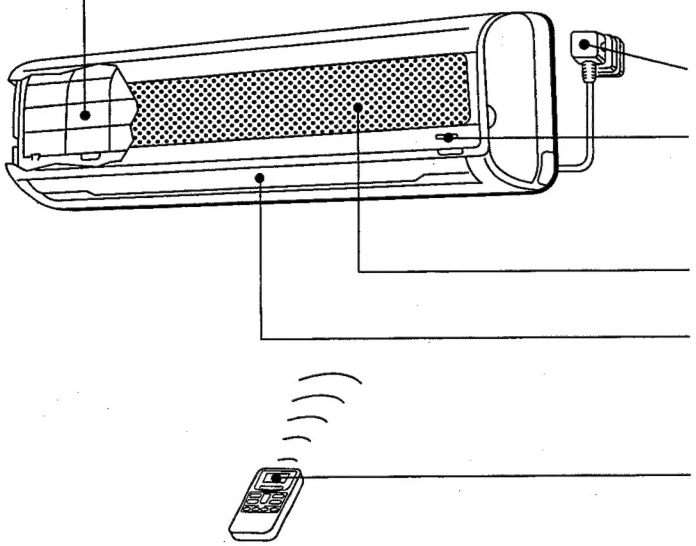
SPECIFICATIONS

MODEL		RAS-25CNH2	RAC-25CNH2
FAN MOTOR		20 W	20 W
FAN MOTOR CAPACITOR		NO	NO
FAN MOTOR PROTECTOR		NO	NO
COMPRESSOR		NO	G920DP5H
COMPRESSOR MOTOR CAPACITOR		NO	NO
OVERLOAD PROTECTOR		NO	YES
OVERHEAT PROTECTOR		NO	YES
FUSE		NO	3.15A
POWER RELAY, STICK RELAY		NO	G4A
POWER SWITCH		YES	NO
TEMPORARY SWITCH		YES	NO
SERVICE SWITCH		NO	YES
TRANSFORMER		NO	NO
VARISTOR		NO	450NR
NOISE SUPPRESSOR		NO	NO
REMOTE CONTROL SWITCH (LIQUID CRYSTAL)		YES	NO
THERMOSTAT		YES (IC)	NO
FUSE CAPACITY		NO	
REFRIGERANT CHARGING VOLUME (Refrigerant 22)	UNIT	---------	※ 690g
	PIPES	WITHOUT REFRIGERANT BECAUSE COUPLING IS FLARE TYPE. P - 105 VK1 (5m), P - 108 VK1 (8m)	

※ 690g for piping set of 5~8m.

NAMES AND FUNCTIONS OF EACH PART

INDOOR UNIT



AIR FILTER
To prevent dust from coming into the indoor unit.
(Refer page 18)

POWER PLUG (NOT PROVIDED)

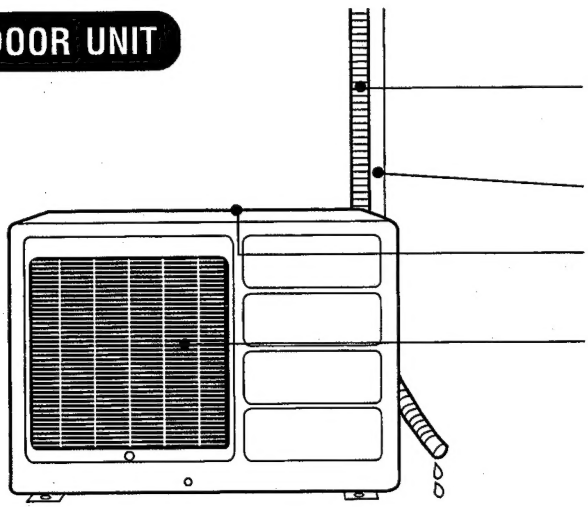
INDOOR UNIT INDICATORS
Light indicator showing the operating condition.
(Refer page 7)

SUCTION GRILL (AIR INLET)

HORIZONTAL DEFLECTOR • VERTICAL DEFLECTOR (AIR OUTLET)
(Refer page 14)

REMOTE CONTROL
Send out operation signal to the indoor unit. So as to operate the whole unit.
(Refer page 8)

OUTDOOR UNIT



DRAIN PIPE
Condensed water drain to outside.

CONNECTING CORD

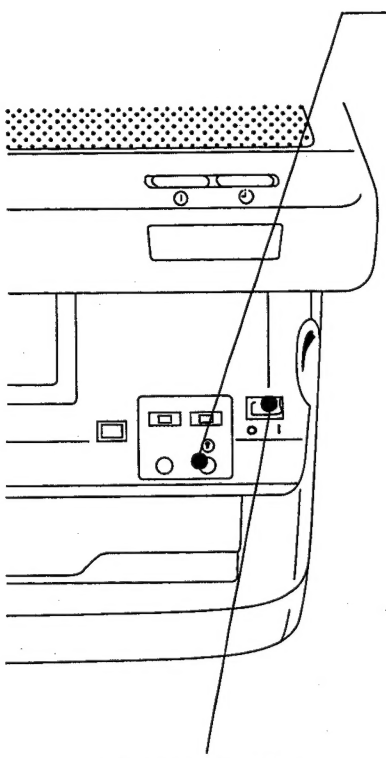
AIR INLET (BACK, LEFT SIDE)

AIR OUTLET

MODEL NAME AND DIMENSIONS

MODEL	WIDTH (mm)	HEIGHT (mm)	DEPTH (mm)
RAS-25CNH2	744	248	168
RAC-25CNH2	700	570	210

OPERATION INDICATOR

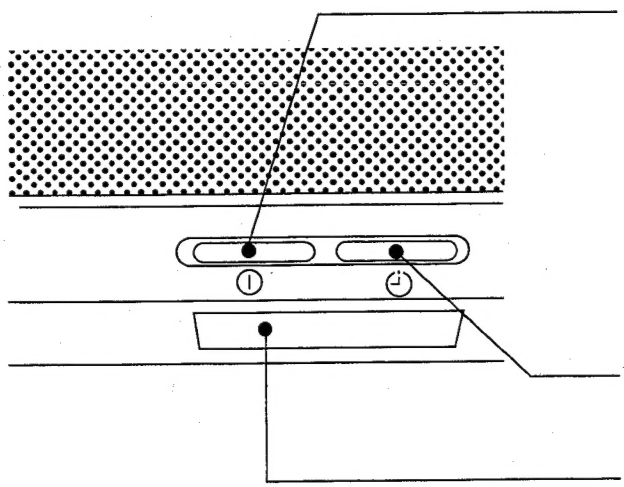


TEMPORARY SWITCH

Use this switch to start and stop when the remote controller does not work.

- By setting the temporary switch, the operation is done in previously set operation mode.
- When the operation is done using the temporary switch after the power source is turned off and turn on again, the operation is done in automatic mode.

INDOOR UNIT INDICATORS



OPERATION LAMP

This lamp lights during operation.
The OPERATION LAMP flashes in the following cases during heating.

(1) During preheating
For about 2–3 minutes after starting up.

(2) During defrosting
Defrosting will be performed about once an hour when frost forms on the heat exchanger of the outdoor unit, for 5–10 minutes each time.

TIMER LAMP

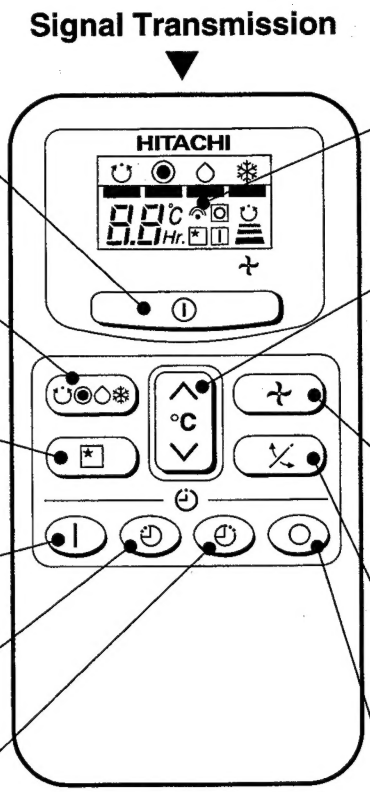
This lamp lights when the timer is working.

SIGNAL RECEIVER

There will be a beep sound when this receiver receives signal from remote controller.

NAMES AND FUNCTIONS OF REMOTE CONTROL UNIT

■ This controls the operation function and timer setting of the room air conditioner. The range of control is about 4 meters. If indoor lighting is controlled electronically, the range of control may be shorter.



START/STOP Button

Press this button to start operation.
Press it again to stop operation.

FUNCTION Button

Select the operation mode.
(☞ Page 10)

SLEEP Button

Use this button to set the sleep timer.
(☞ Page 12)

Reserve Button

Timer setting reservation.

OFF TIMER Button

Select the turn OFF time.

ON TIMER Button

Select the turn ON time.

Transmission Sign

The transmission sign blinks when a signal has been send.

TEMPERATURE Button

Room temperuture setting.
Value will change more quickly when keep pressing.
(☞ Page 9)

FAN SPEED Button

Select the fan speed for cooling and heating mode.
(☞ Page 10)

AUTO SWING Button

Control the angle of the horizontal air deflector.
(☞ Page 14)

CANCEL Button

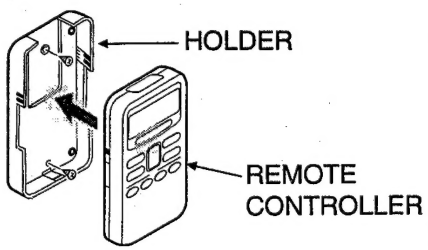
Cancel timer reservation.

Precautions for Use

- Do not put the remote controller in direct sunlight and high temperature.
- Do not drop it on the floor, and protect it from water.
- If you press the FUNCTION button during operation, the air conditioner may stop for about 3 minutes for protection before you can start it again.

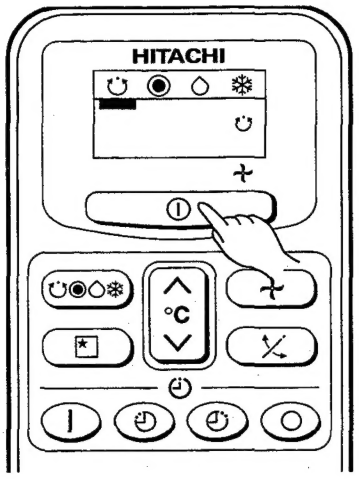
You can use the remote controller by fixing it on the wall with the accessory parts.

- Before fixing it, make sure the unit can be controlled by the remote control unit at the fixing position.



AUTOMATIC OPERATION

■ The device will automatically determine the mode of operation, HEAT, COOL or DEHUMIDIFY, depending on the initial room temperature. The selected mode of operation will not change when the room temperature varies.



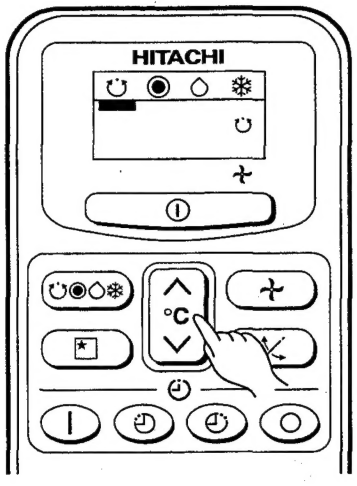
1 **Press the ⏻ (START/STOP) button**

- Operation start with a "beep" sound.

STOP **Press the ⏻ (START/STOP) button**

- Make sure the ↻ (Automatic) mode have been selected by using the (FUNCTION) button.
- The fan speed selector does not work at this operation.

■ You can slightly adjust the room temperature.



1 **Press the ∧ °C ∨ (ROOM TEMPERATURE) button**

- Temperature setting change by 1°C for each 1 time press.

  ∧ °C ∨ ◀ Up
  ◀ Down

- You can raise or lower the temperature setting by a maximum of 3°C.
- The display does not indicate the preset temperature in the Automatic mode. Device will receive the setting by a "beep".

■ CONDITION OF AUTOMATIC OPERATION

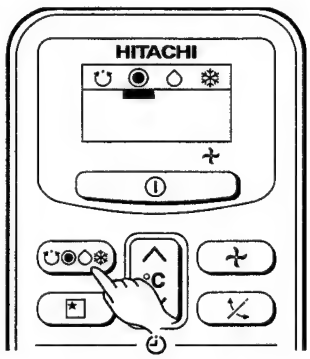
- The selected mode of operation will not change during the operation even though the room temperature change.

INITIAL ROOM TEMPERATURE (APPROX.)	FUNCTION	TEMPERATURE SETTING	FAN SPEED
Over 27°C ➡	COOL	27°C	HIGH at start, LOW after the preset temperature is reached
23 ~ 27°C ➡	DRY	Slightly lower than the room temperature	LOW
Under 23°C ➡	HEAT	23°C	HIGH at start, MED or LOW after the preset temperature is reached

MANUAL OPERATION [Heating • Dehumidify • Cooling]

■ Please use under below condition when you want to set the function mode, room temperature and fan speed by manually.

HEATING	DEHUMIDIFYING	COOLING
Outdoor Temperature 21°C below	Room Temperature 16°C above	Outdoor Temperature 22°C above

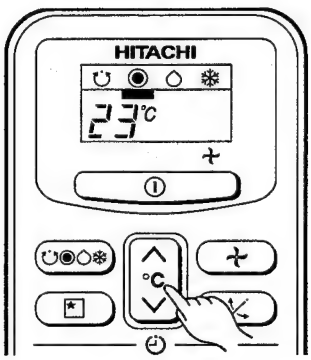


1 OPERATION MODE SELECTION

- Every time you press the button, the mode will change as the below sequence

  ⟳ (Auto) → ◉ (Heat) → ◇ (Dry) → ❄ (Cool)

2 ROOM TEMPERATURE SETTING



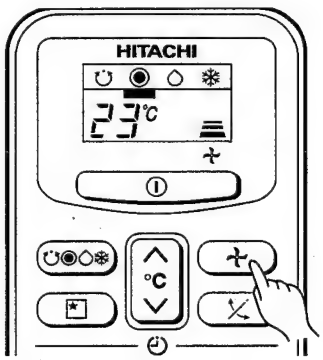
◀ Up
◀ Down

■ Recommend Temperature

Heating	20~24°C
Dehumidify	20~26°C
Cooling	25~28°C

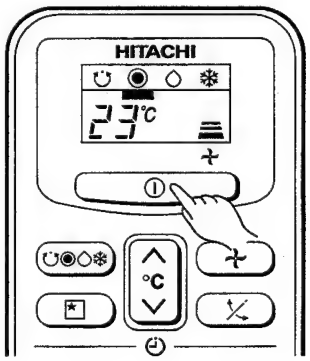
- The cooling operation does not start if the temperature setting is higher than the current room temperature.

3 FAN SPEED SETTING



- Every time you press the button, fan speed will change as the below sequence.
- **HEATING** } : AUTO → HIGH → MED → LOW
  COOLING } : (⟳ → ≡ → = → ¯)
- **DEHUMIDIFYING** : **LOW (FIXED)**
  : (¯)

4 Press the ⏻ (START/STOP) button



- Operation start with a signal received sound "beep".

STOP **Press the ⏻ (START/STOP) button**

- As the settings are stored in memory in the remote control unit, you only have to press the ⏻ (Start/Stop) button in order to use the same setting next time.

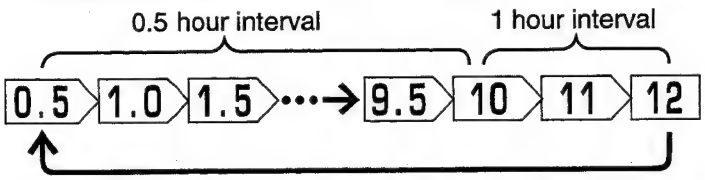
TIMER RESERVATION

■ ON Timer and OFF Timer are available.

OFF Timer Reservation

1 (OFF) OFF TIME setting

- Select the OFF TIME by pressing the (OFF) Button.
- Setting time will change according to the below sequence when you press the button.

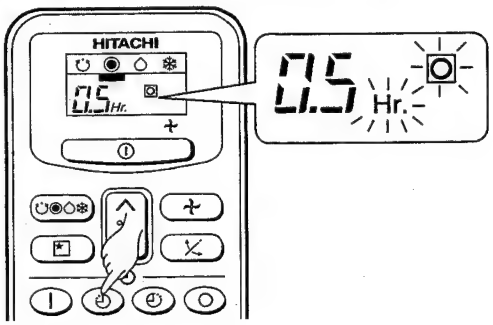


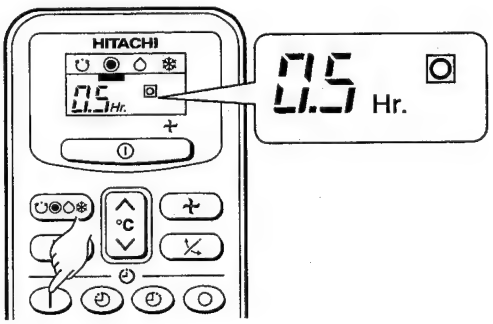
- The value change more quickly if you keep pressing the button.

2 Press the (Reserve) button

- OFF TIMER reserved with a signal received sound "beep".
- The ⊡ (OFF) Mark starts lighting instead of blinding.

■ Operation stop at setting time

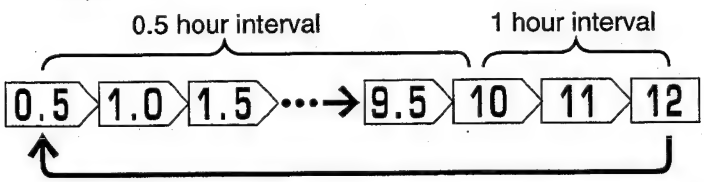




ON Timer Reservation

1 (ON) ON TIME setting

- Select the ON TIMER by pressing the (ON) Button.
- At the beginning of setting, time 6 hours was set.
- Setting time will change according to the below sequence.

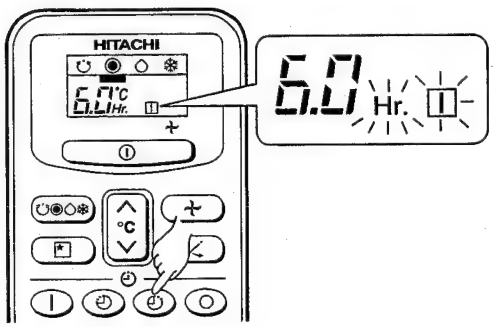


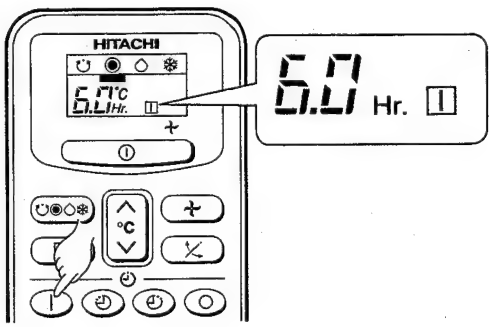
- The value change more quickly if you keep pressing the button.

2 Press the (Reserve) button

- ON TIMER reserved with a signal received sound "beep".
- The ⊡ (ON) Mark starts lighting instead of blinding.

■ Operation will start for setting temperature at setting time (The starting time may different depend on the room temperature and set temperature).





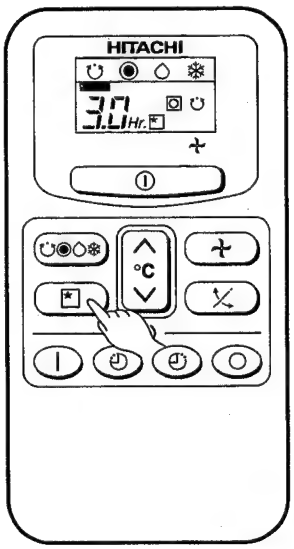
CANCELLATION of Timer Reservation

1 Press the (Cancel) button

- As the time settings are stored in remote controller memory, you only have to press the (Reserve) button in order to use the same setting next time.

HOW TO SET THE SLEEP TIMER

Set the current time at first if it is not set before (see the pages for setting the current time). Press the ⊡ (SLEEP) button, and the display changes as shown below.



Example: Setting 3 hours sleep time.

Mode	Indication
Sleep timer	1 hour → 2 hours → 3 hours → 7 hours → Sleep timer off

Sleep Timer: The device will continue working for the designated number of hours and then turn off.
Point the signal window of the remote controller toward the indoor unit, and press the SLEEP button.
The timer information will be displayed on the remote controller.
The TIMER lamp lights with a beep from the indoor unit.

How to Cancel Reservation

Point the signal window of the remote controller toward the indoor unit, and press the ○ (CANCEL) button.
The ◴ (RESERVED) sign goes out with a beep and the ◴ (TIMER) lamp turns off on the indoor unit.

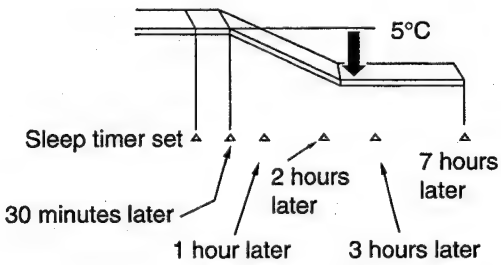
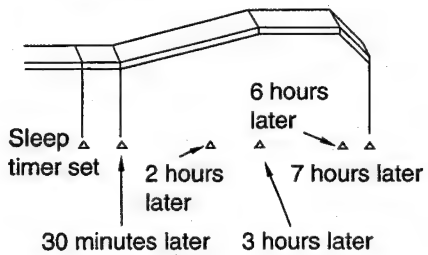
NOTE

If you set the sleep timer when the off-timer or on/off-timer has been set earlier, the sleep timer becomes effective instead of the off- or on/off-timer set earlier.

Explanation of the sleep timer

The device will control the FAN SPEED and room temperature automatically so as to be quiet and good for people's health.
You can set the sleep timer to turn off after 1, 2, 3 or 7 hours. The FAN SPEED and room temperature will be controlled as shown below.

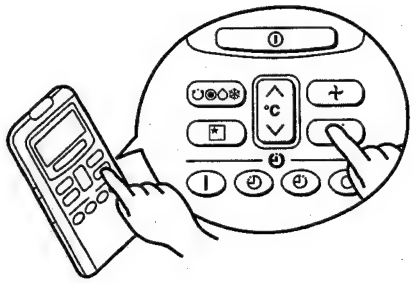
Operation with the sleep timer

Function	Operation
Heating " ◉ "	The room temperature will be controlled 5°C below the temperature setting 30 minutes after the setting of the sleep timer. The FAN SPEED will be set to LOW immediately. The room temperature is kept at about 12°C minimum. 
Cooling " ❄ " and dehumidifying " ○ "	The FAN SPEED will be set to LOW immediately. The room temperature is kept at about 25–28°C. 
Fan " ✣ "	The settings of room temperature and circulation are not varied.

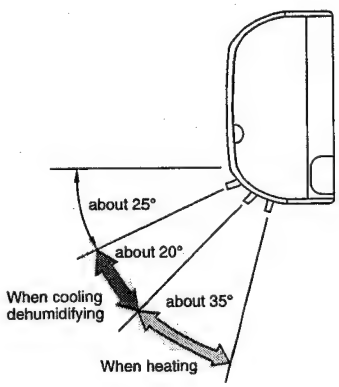
ADJUSTING THE AIR DEFLECTOR

1 Adjustment of the conditioned air in the upward and downward directions.

According to operation, the horizontal air deflector is automatically set to the proper angle suitable for each operation. The deflector can be swing up and down and also set to the desired angle using the " (AUTO SWING)" button. (If the angle of the deflector is changed, it will not return to the auto-set position after operations start unless the operation mode is switched.)



- If the " (AUTO SWING)" button is pressed once, the horizontal air deflector swings up and down. If the button is pressed again, the deflector stops in its current position. Several seconds (about 6 seconds) may be required before the deflector starts to move.
- Use the horizontal air deflector within the adjusting range shown on the right.
- When the operation is stopped, the horizontal air deflector moves and stops at the position where the air outlet closes.

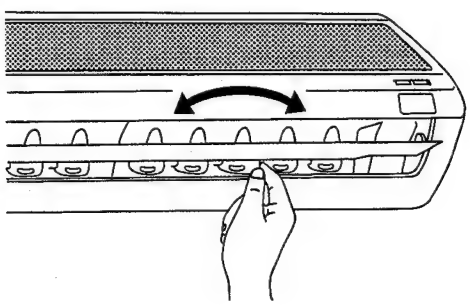


⚠ CAUTION

- In "Cooling" operation, do not keep the horizontal air deflector swinging for a long time. Some dew may form on the horizontal air deflector and some dew drops may fall from it.

2 Adjustment of the conditioned air to the left and right.

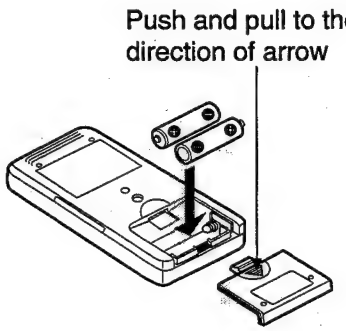
Hold the vertical air deflector as shown in the figure and adjust the conditioned air to the left and right.



HOW TO EXCHANGE THE BATTERIES IN THE REMOTE CONTROLLER

1 Remove the cover as shown in the figure and take out the old batteries.

2 Install the new batteries.
The direction of the batteries should match the marks in the case.

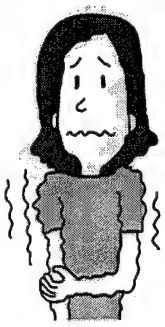


⚠ CAUTION

1. Do not use new and old batteries, or different kinds of batteries together.
2. Take out the batteries when you do not use the remote controller for 2 or 3 months.
3. The batteries must be of the LR03 type.

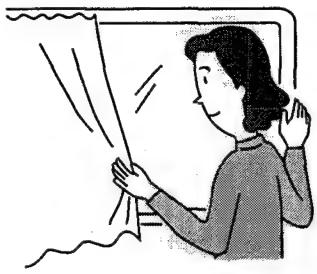
THE IDEAL WAYS OF OPERATION

Suitable Room Temperature



⚠ Warning
Freezing temperature is bad for health and a waste of electric power.

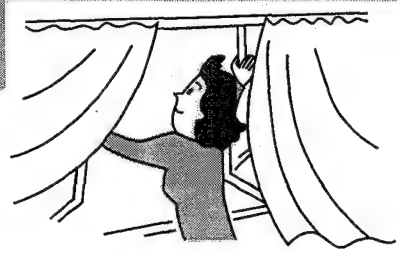
Install curtain or blinds



It is possible to reduce heat entering the room through windows.

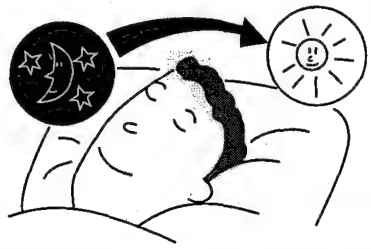
Ventilation

⚠ Caution
Do not close the room for a long period of time. Occasionally open the door and windows to allow the entrance of fresh air.



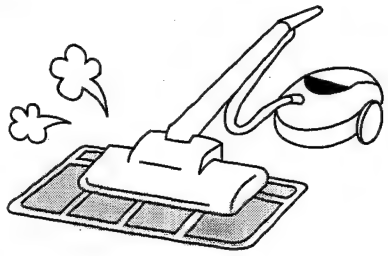
Effective Usage Of Timer

At night, please use the "OFF or ON timer operation mode", together with your wake up time in the morning. This will enable you to enjoy a comfortable room temperature. Please use the timer effectively.



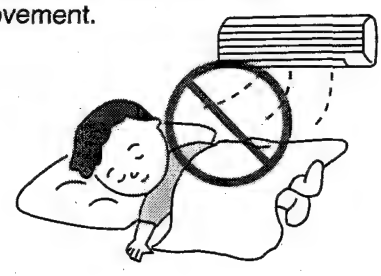
Do Not Forget To Clean The Air Filter

Dusty air filter will reduce the air volume and the cooling efficiency. To prevent from wasting electric energy, please clean the filter every 2 weeks.



Please Adjust Suitable Temperature For Baby And Children

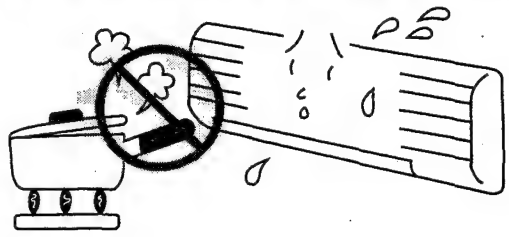
Please pay attention to the room temperature and air flow direction when operating the unit for baby, children and old folks who have difficulty in movement.



FOR USER'S INFORMATION

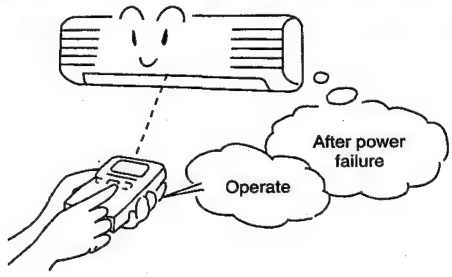
The Air Conditioner And The Heat Source In The Room

⚠ Caution
If the amount of heat in the room is above the cooling capability of the air conditioner (for example: more people entering the room, using heating equipments and etc.), the preset room temperature cannot be achieved.



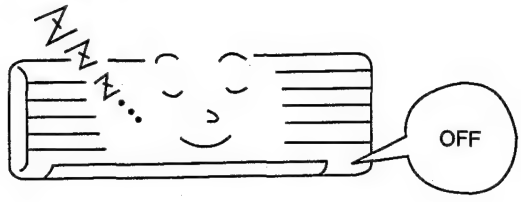
After Power Failure

When the power is resumed after a power failure, the indoor unit will still remain "OFF". To operate the unit, please press the "ON/OFF" button again.



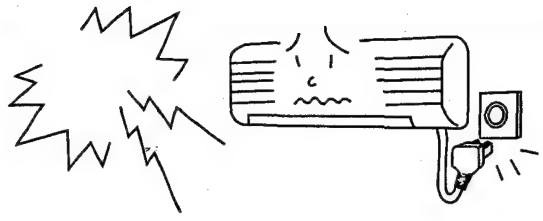
Not Operating For A Long Time

When the indoor unit is not to be used for a long period of time, please switch off the power from the mains. If the power from mains remains "ON", the indoor unit still consumes about 8W in the operation control circuit even if it is in "OFF" mode.



When Lightning Occurs

⚠ Warning
To protect the whole unit during lightning, please stop operating the unit and remove the plug from the socket.



MAINTENANCE

⚠ CAUTION

Before the cleaning, stop operation and disconnect the power supply.

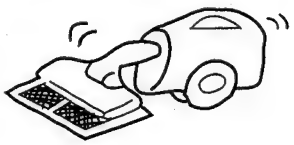
1. AIR FILTER

Clean the air filter, as it removes dust inside the room. In case the air filter is full of dust, the air flow will decrease and the cooling capacity will be reduced. Further, noise may occur. Be sure to clean the filter following the procedure below.

PROCEDURE

1 Remove the filter

- Be sure to hold the button sides on the left and right of the front grille with both hands and pull up the grille forward.
- Slightly lift the filter and release the claws (4 locations) at the lower part of the front cover and remove the filter from the lower side.

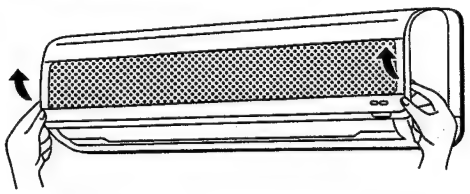


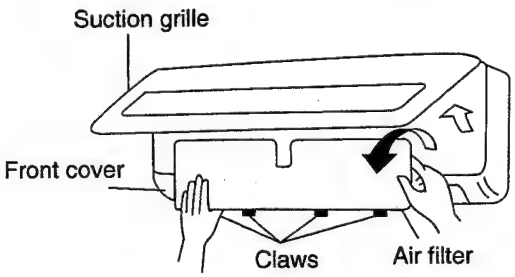
2 Remove dust from the filter using a vacuumcleaner.
If there is too much dust, use neutral detergent. After using neutral detergent, wash with clean water and dry in the shade.

3 Install the filter. (Set them with "FRONT" mark facing front.)

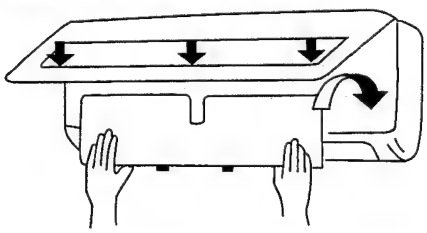
- Be sure to hold the front grille with both hands and close it, then push the three sections indicated by the arrows.

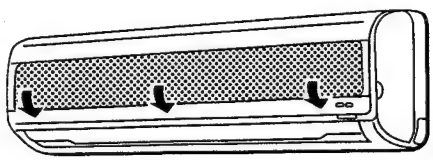
REMOVING METHOD





INSTALLATION METHOD



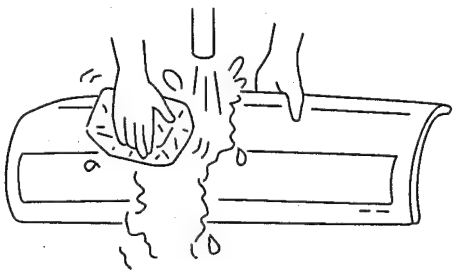


⚠ CAUTION

- Do not wash with hot water at more than 40°C. The filter may shrink.
- When washing it, shake off moisture completely and dry it in the shade; do not expose it directly to the sun. The filter may shrink.
- Do not operate the air conditioner with the filter removed. Dust may enter the air conditioner and cause trouble.

2. Washable Suction Grille

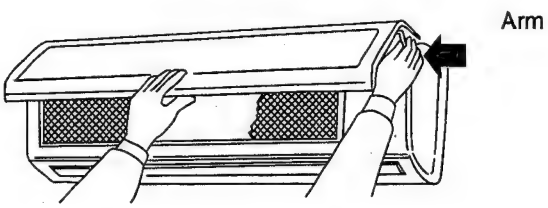
- The suction grille remove and can wash with clean water in whole.
  Wash it with a soft sponge.
  After using neutral detergent, wash thoroughly with clean water.



- When it is not removed, wipe it with a soft dry cloth. Wipe the remote controller thoroughly with a soft dry cloth.
- Wipe the water thoroughly.
  If the water remains at indicators or signal receiver of indoor unit, it causes trouble.

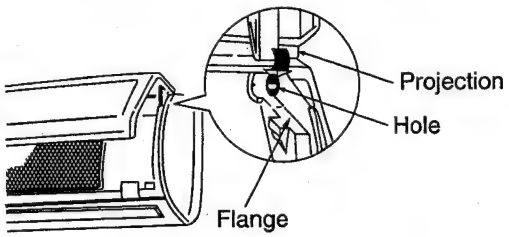
Method to remove of the suction grille.
Be sure to hold the suction grille with both hands to detach and attach it.

Removing the Suction Grille



- When the suction grille is fully opened with both hands, push the right arm to the inside to release it, and while closing the suction grille slightly, put it out forward.

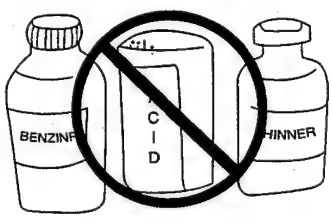
Attaching the Suction Grille



- Move the projections of the left and right arms into the **Flanges** in the unit and securely insert them into the holes.

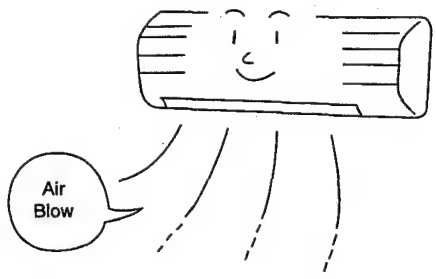
⚠ CAUTION

- Do not splash or direct water to the body of the unit when cleaning it as this may cause short circuit.
- Never use hot water (above 40°C), benzine, gasoline, acid, thinner or a brush, because they will damage the plastic surface and the coating.



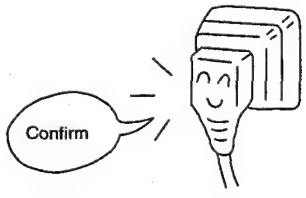
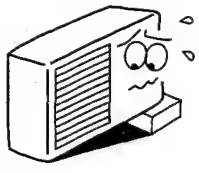
3. MAINTENANCE AT BEGINNING OF LONG OFF PERIOD

- Running the unit setting the operation mode to ❄ (COOL), the temperature to 32°C and the fan speed to HI for about half a day on a fine day, and dry the whole of the unit.
- Disconnect the power plug.



REGULAR INSPECTION

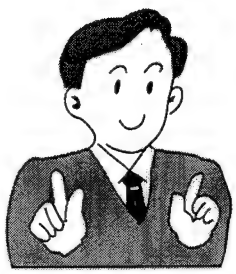
PLEASE CHECK THE FOLLOWING POINTS EVERY EITHER HALF YEARLY OR YEARLY.
CONTACT YOUR SALES AGENT SHOULD YOU NEED ANY HELP.

1		Is the plug of power line firmly plugged into the socket? (Please ensure no loose contact between them).
2		Is the earth line disconnected or broken?
3		Is the mounting frame seriously affected by rust and is the outdoor unit tilted or unstable?

AFTER SALE SERVICE AND WARRANTY

WHEN ASKING FOR SERVICE, CHECK THE FOLLOWING POINTS.

CONDITION	CHECK THE FOLLOWING POINTS
When it does not operate	• Is the fuse all right? • Is the voltage extremely high or low? • Is the circuit breaker "ON"?
When it does not cool well When it does not hot well	• Is the air filter blocked with dust? • Does sunlight fall directly on the outdoor unit? • Is the air flow of the outdoor unit obstructed? • Are the doors or windows opened, or is there any source of heat in the room? • Is the set temperature suitable?



Notes

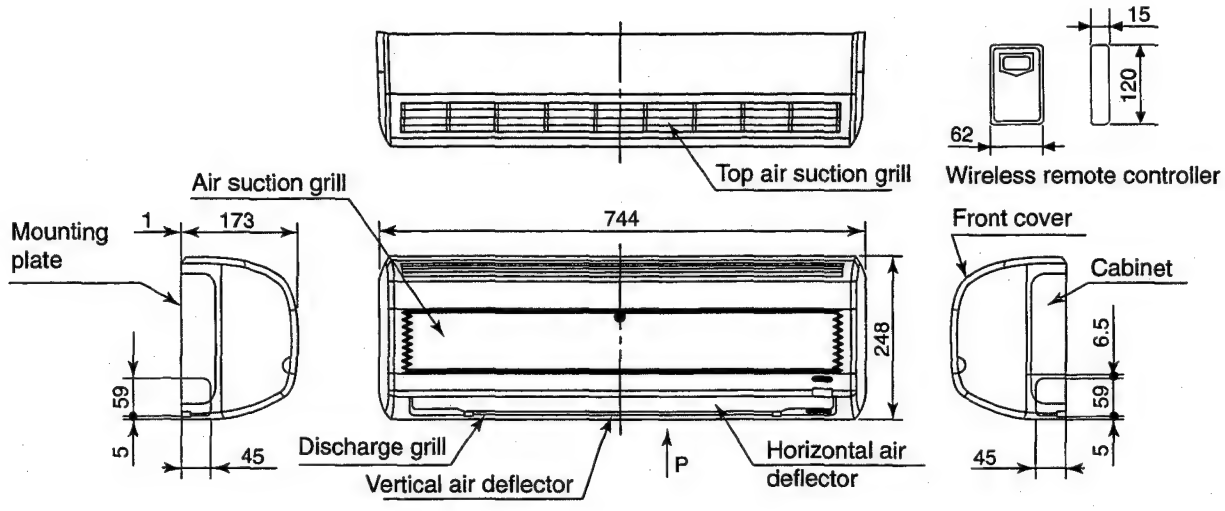
- In quiet operation or stopping the running, the following phenomena may occassionally occur, but they are not abnormal for the operation.
  (1) Slight flowing noise of refrigerant in the refrigerating cycle.
  (2) Slight rubbing noise from the fan casing which is cooled and then gradually warmed as operation stops.
- The odor will possibly be emitted from the room air conditioner because the various odor, emitted by smoke, foodstuffs, cosmetics and so on, sticks to it. So please clean the air filter and the evaporator regularly to reduce the odor.

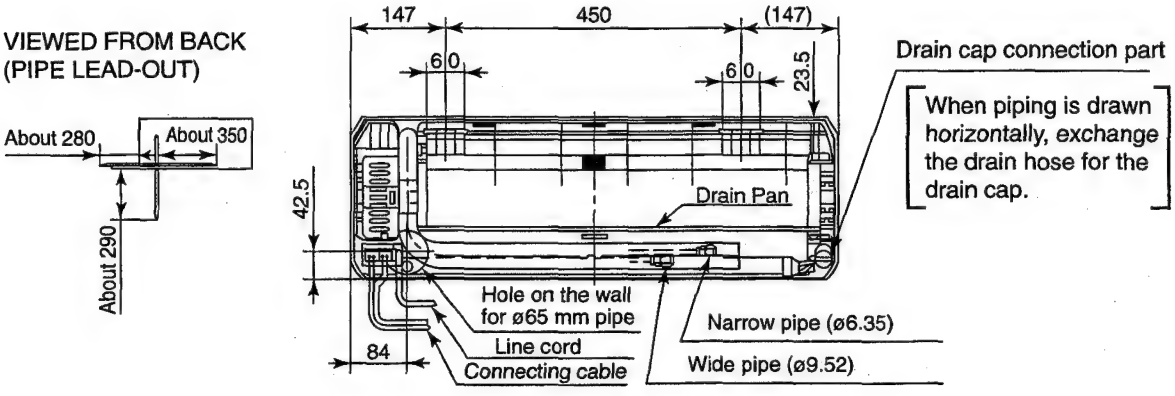
- Please contact your sales agent immediately if the air conditioner still fails to operate normally after the above inspections. Inform your agent of the model of your unit, production number, date of installation. Please also inform him regarding the fault.

- Power supply shall be connected at the rated voltage, otherwise the unit will be broken or could not reach the specified capacity.

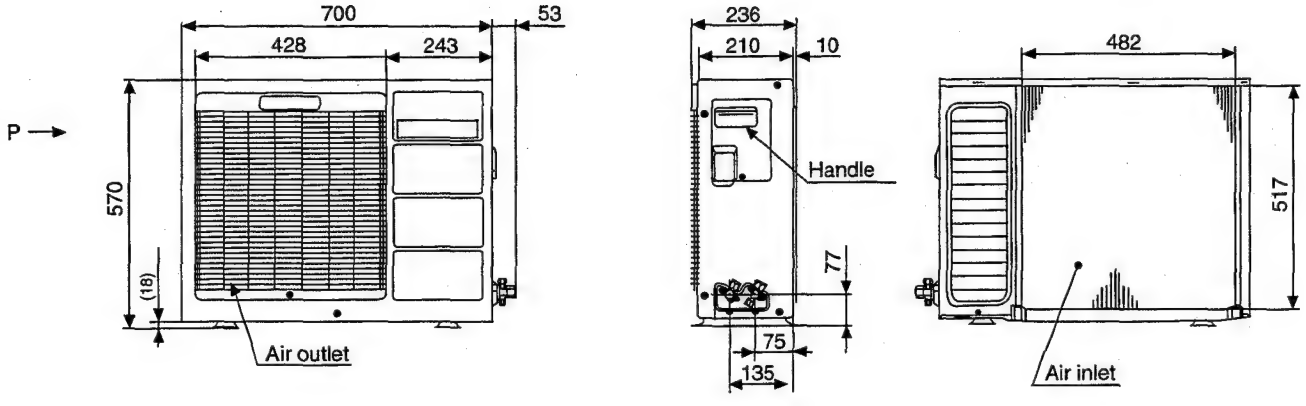
CONSTRUCTION AND DIMENSIONAL DIAGRAM

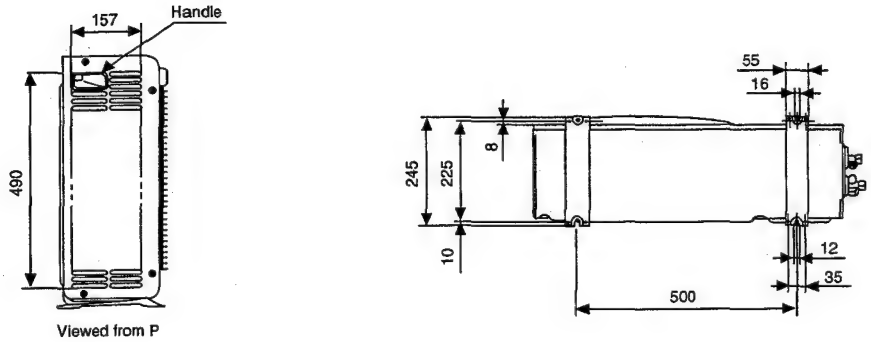
MODEL RAS-25CNH2





MODEL RAC-25CNH2





MAIN PARTS COMPONENT

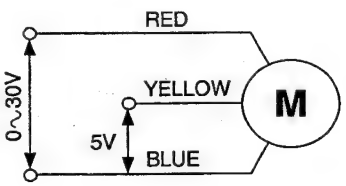
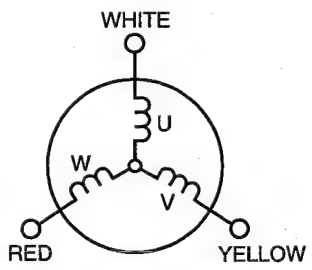
THERMOSTAT

Thermostat Specifications

MODEL			RAS-25CNH2
THERMOSTAT MODEL			IC
TEMPERATURE °C (°F)	INDICATION 16	ON	17.6 (63.7)
		OFF	16.6 (61.8)
	INDICATION 24	ON	25.6 (78.1)
		OFF	24.6 (76.3)
	INDICATION 32	ON	33.6 (92.5)
		OFF	32.6 (90.7)

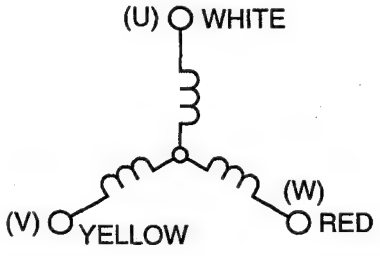
FAN MOTOR

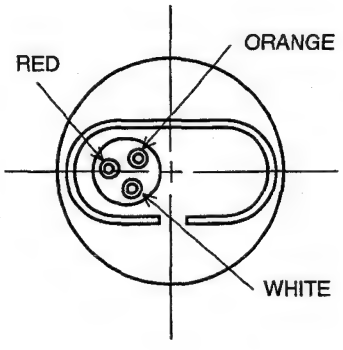
Fan Motor Specifications

MODEL		RAS-25CNH2	RAC-25CNH2
RATED VOLTAGE		DC0 – 35V	DC230V
OUTPUT		20W	20W
CONNECTION			
RESISTANCE VALUE (Ω)	20°C (68°F)	———	———
	75°C (167°F)	———	———

COMPRESSOR MOTOR

Compressor Motor Specifications

MODEL		RAC-25CNH2
COMPRESSOR MODEL		G920DP5H
PHASE		SINGLE
RATED VOLTAGE		AC 220 – 240 V
RATED FREQUENCY		50 Hz
POWER SOURCE FOR COMPRESSOR		Vcc max = 360V
POLE NUMBER		4
CONNECTION		
RESISTANCE VALUE (Ω)	20°C (68°F)	2M = 3.21
	75°C (167°F)	2M = 3.90

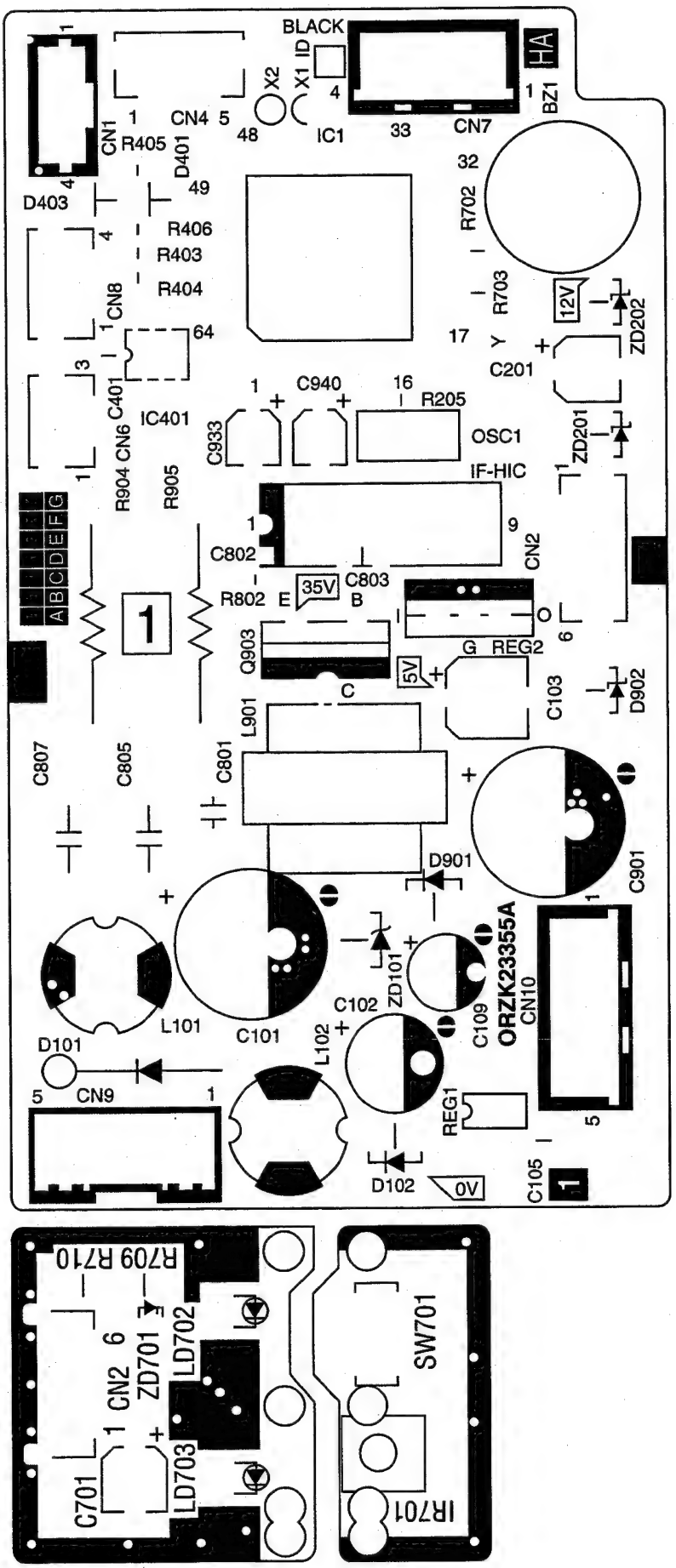


⚠ CAUTION

When the refrigerating cycle has been operated for a long time with the capillary tubes clogged or crushed or with too little refrigerant, check the color of the refrigerating machine oil inside the compressor. If the color has been changed conspicuously, replace the compressor.

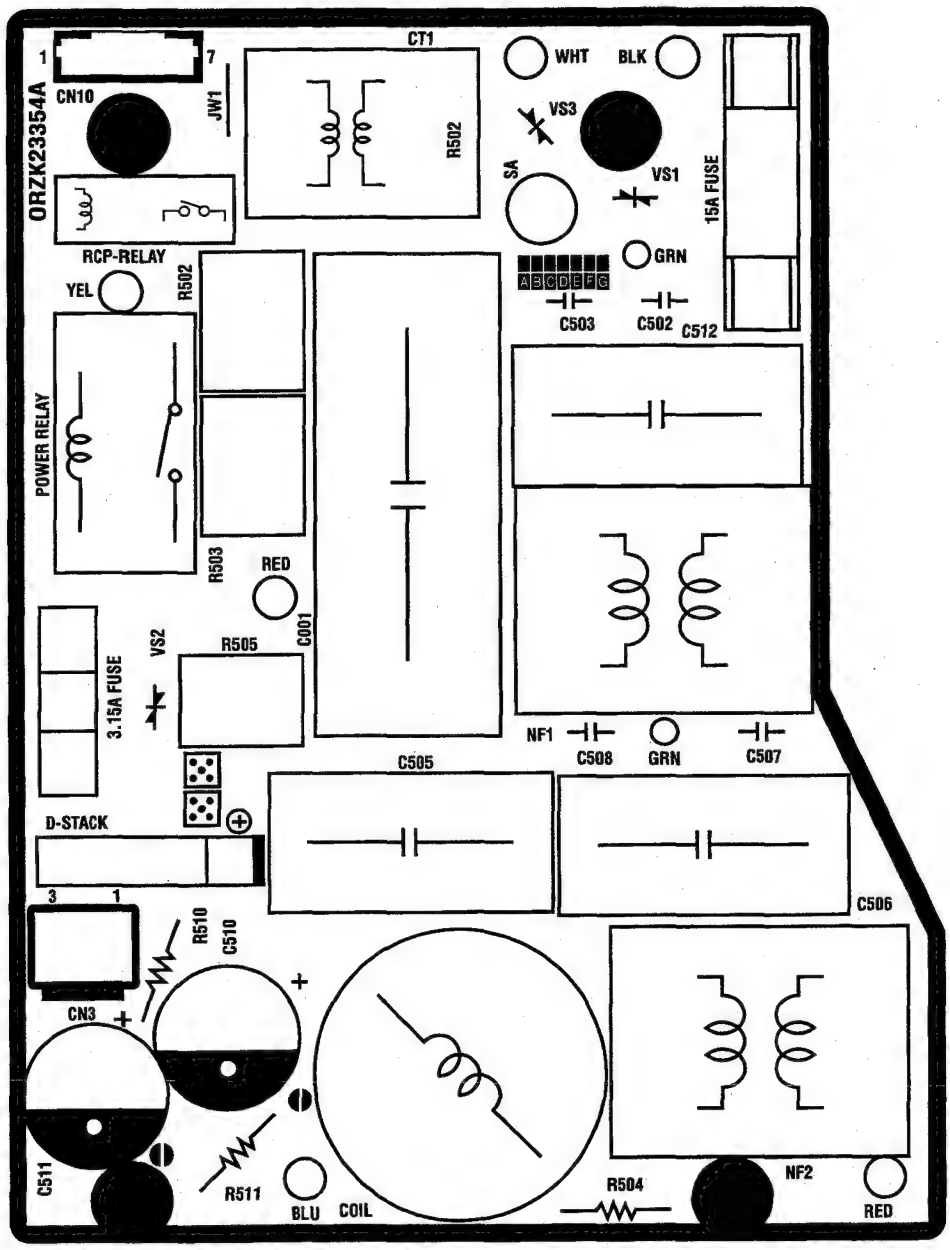
PRINTED WIRING BOARD LOCATION DIAGRAM

MODEL RAS-25CNH2



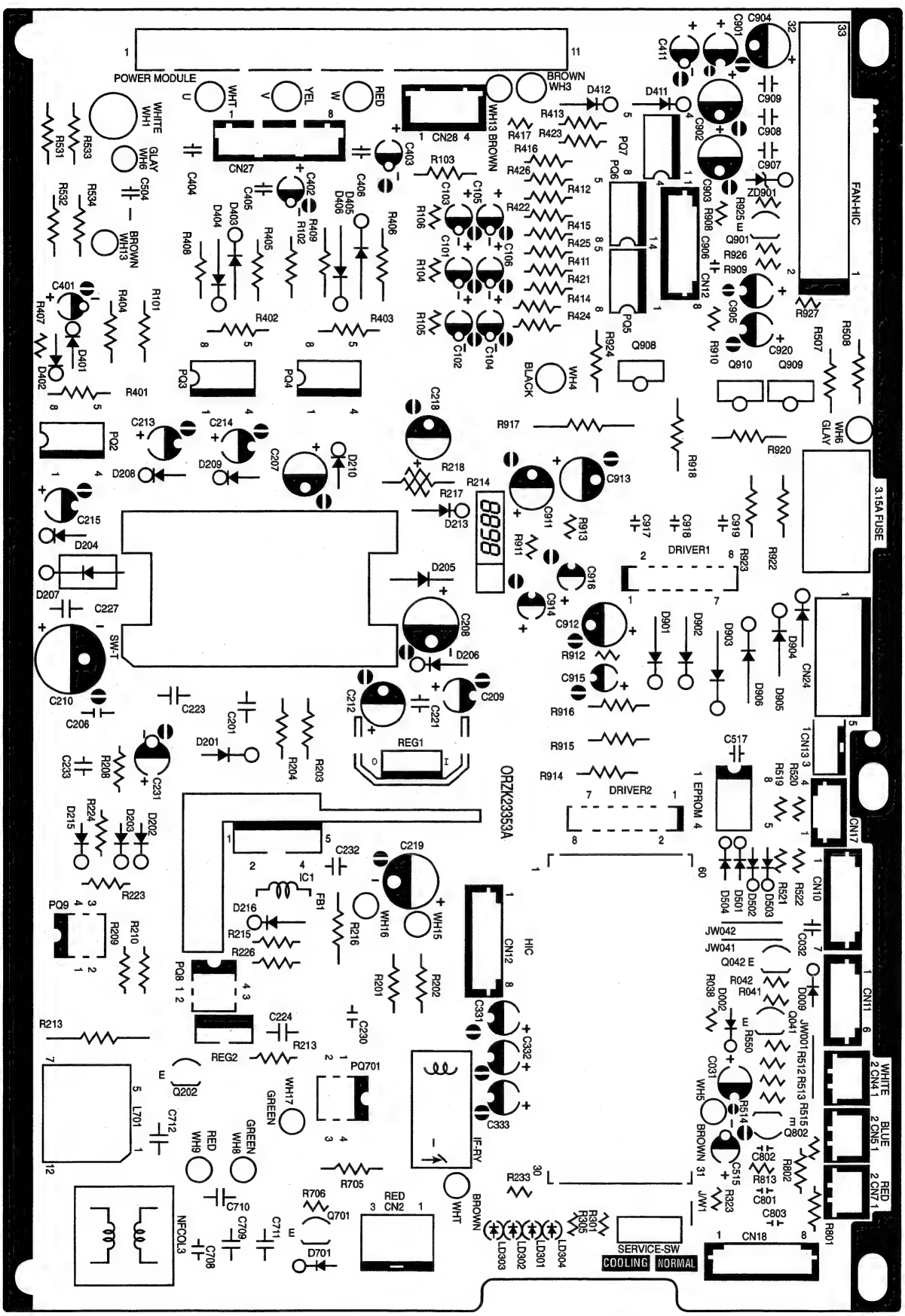
MODEL RAC-25CNH2

POWER P.W.B.

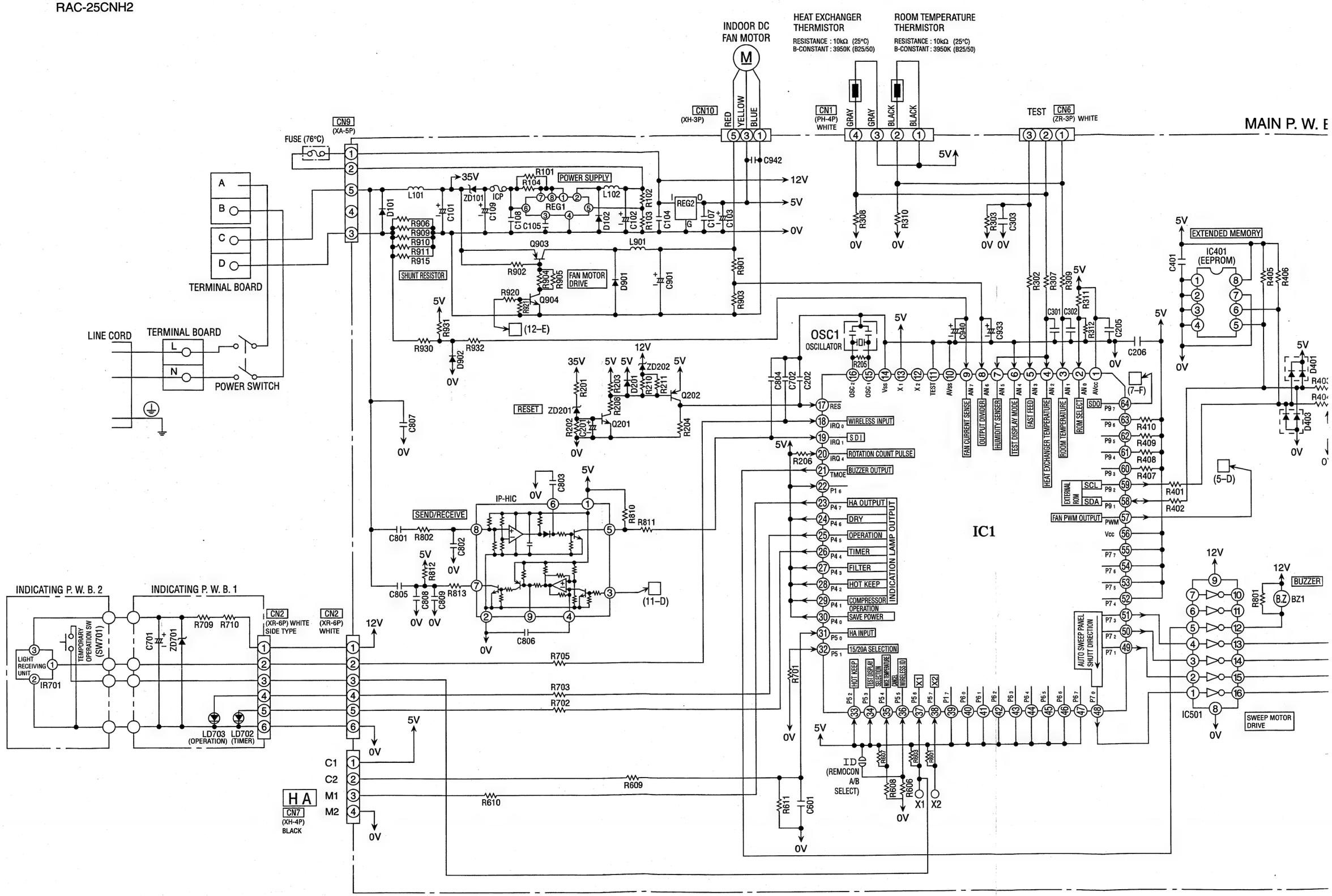


MODEL RAC-25CNH2

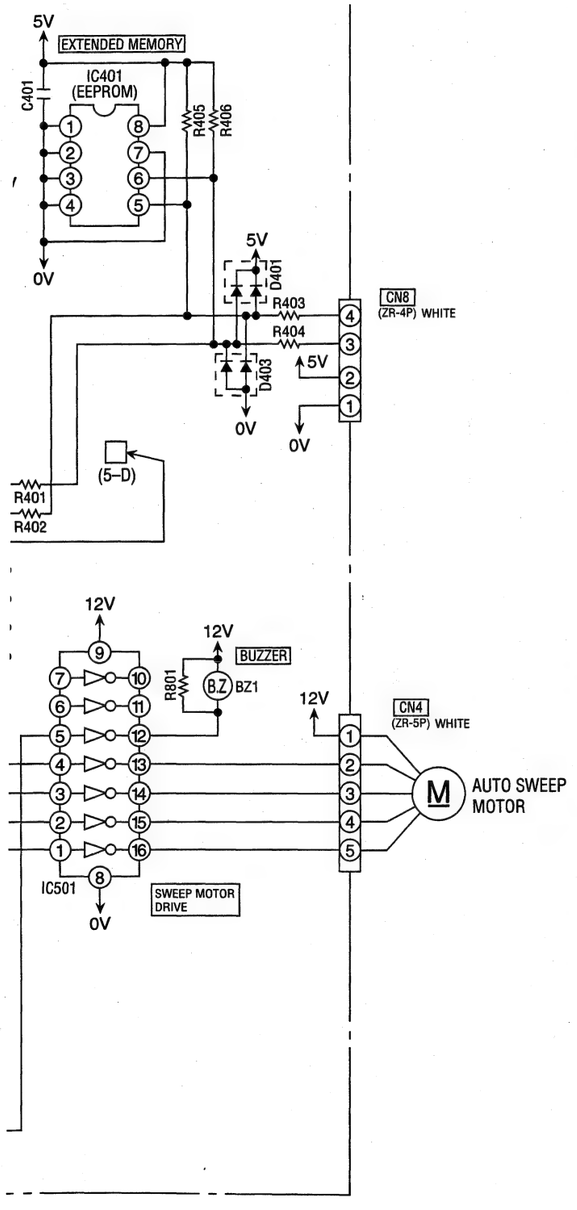
MAIN P.W.B.



MODEL RAS-25CNH2
RAC-25CNH2



MAIN P. W. B.



SYMBOL ... MOUTING FORM
H ... INSERT BY HAND
C ... CHIP

RESISTOR

SYMBOL	RETER VALUE Ω	TOLE-RANCE	POWER	FORM
R101	1.0	±5%	1/4W	C
R102	10K	±2%	1/16W	C
R103	1.2K	±2%	1/16W	C
R104	1.0	±5%	1/4W	C
R201	5.1K	±5%	1/10W	C
R202	10K	±5%	1/10W	C
R203	2.7K	±5%	1/16W	C
R204	5.1K	±5%	1/16W	C
R205	1M	±5%	1/16W	C
R206	10K	±5%	1/10W	C
R208	5.1K	±5%	1/10W	C
R210	12K	±5%	1/10W	C
R211	12K	±5%	1/10W	C
R302	1K	±5%	1/16W	C
R303	10K	±5%	1/16W	C
R307	1K	±5%	1/16W	C
R308	12.7K	±1%	1/10W	C
R309	1K	±5%	1/16W	C
R310	12.7K	±1%	1/10W	C
R311	1K	±5%	1/16W	C
R312	10K	±5%	1/16W	C
R401	390	±5%	1/16W	C
R402	390	±5%	1/16W	C
R403	390	±5%	1/16W	C
R404	390	±5%	1/16W	C
R405	5.1K	±5%	1/16W	C
R406	5.1K	±5%	1/16W	C
R407	10K	±5%	1/16W	C
R408	10K	±5%	1/16W	C
R409	10K	±5%	1/16W	C
R410	10K	±5%	1/16W	C
R601	10K	±5%	1/16W	C
R603	10K	±5%	1/16W	C
R606	10K	±5%	1/16W	C
R607	10K	±5%	1/16W	C
R608	1K	±5%	1/16W	C
R609	1K	±5%	1/16W	C
R610	10K	±5%	1/16W	C
R611	10K	±5%	1/16W	C

RESISTOR

SYMBOL	RETER VALUE Ω	TOLE-RANCE	POWER	FORM
R701	1K	±5%	1/16W	C
R702	390	±5%	1/10W	C
R703	200	±5%	1/10W	C
R705	1K	±5%	1/16W	C
R709	1K	±5%	1/4W	C
R710	1K	±5%	1/4W	C
R801	3.3K	±5%	1/10W	C
R802	1K	±5%	1/16W	C
R810	5.1K	±5%	1/16W	C
R811	5.1K	±5%	1/16W	C
R812	39	±5%	1/4W	C
R813	39	±5%	1/4W	C
R901	20K	±1%	1/10W	C
R902	300	±5%	1/16W	C
R903	2.21K	±1%	1/10W	C
R904	2.0K	±5%	2W	H
R905	2.0K	±5%	2W	H
R906	1.5	±5%	1/4W	C
R909	1.5	±5%	1/4W	C
R910	1.5	±5%	1/4W	C
R911	1.5	±5%	1/4W	C
R915	1.5	±5%	1/4W	C
R920	3.3K	±5%	1/16W	C
R921	3.3K	±5%	1/16W	C
R930	1K	±1%	1/10W	C
R931	8.25K	±1%	1/10W	C
R932	5.1K	±5%	1/16W	C

CAPACITOR

SYMBOL	RATING	KIND	FORM
C101	220µ.50V	D (PJ)	H
C102	100µ.50V	D (PJ)	H
C103	100µ.10V	D (WX)	C
C104	0.1µ.25V	C	C
C105	220P.50V	C	C
C107	0.047µ.25V	C	C
C108	0.022µ.50V	C	C
C109	56µ.50V	D (PF)	H
C201	33µ.10V	D (WX)	C
C202	0.1µ.25V	C	C
C205	0.1µ.25V	C	C

CAPACITOR KIND
C ... CERAMIC CAPACITOR F ... FILM CAPACITOR
D ... ELECTOLYTIC CAPACITOR

CAPACITOR

SYMBOL	RATING	KIND	FORM
C206	0.1µ.25V	C	C
C301	0.1µ.25V	C	C
C302	0.1µ.25V	C	C
C303	0.1µ.25V	C	C
C401	0.1µ.25V	C	C
C601	0.1µ.25V	C	C
C701	33µ.10V	D	C
C702	1000P.50V	C	C
C801	10000P.50V	F	H
C802	1000P.50V	C	C
C803	0.047µ.16V	F	C
C804	0.01µ.50V	C	C
C805	0.22µ.50V	F	H
C806	150P.50V	C	C
C807	0.22µ.50V	F	H
C808	0.1µ.25V	C	C
C809	0.1µ.25V	C	C
C901	150µ.50V	D (PF)	H
C933	10µ.16V	D (WX)	C
C940	10µ.16V	D (WX)	C
C942	0.1µ.25V	C	C

TRANSISTOR

SYMBOL	MODEL NO.	FORM
Q201	2SC2462LC	C
Q202	2SA1121SC	C
Q903	2SA1757F	H
Q904	2SC3624A	C

DIODE

SYMBOL	MODEL NO.	FORM
D101	G4DL-6140	H
D102	D1FS6	C
D201	HSM2838C	C
D401	HSM2838C	C
D403	HSM2836C	C
D901	D1FS6	C
D902	LFB01	C

LED

SYMBOL	MODEL NO.	COLOR	FORM
LD702	SLR-332DC3F	ORANGE	H
LD703	SLR-332YC3F	YELLOW	H

ZENNER DIODE

SYMBOL	MODEL NO.	FORM
ZD101	PTZ5.1	C
ZD201	RLZ24	C
ZD202	RLZ10	C
ZD701	RD5.1UJN2	C

IC

SYMBOL	MODEL NO.	FORM
REG1	MC34063AM	C
REG2	MC7805CT	H
IC1	HD6433714	C
IC401	S24CO1AFJ	C
IC501	ULN2003ANS	C
IF-HIC	RREA3725	H
IR701	RRZL1816	H

OSCILLATOR

SYMBOL	MODEL NO.	FORM
OSC1	EFOEC8004A4	H

ICP

SYMBOL	MODEL NO.	FORM
ICP	ICP-SO.5	C

COIL

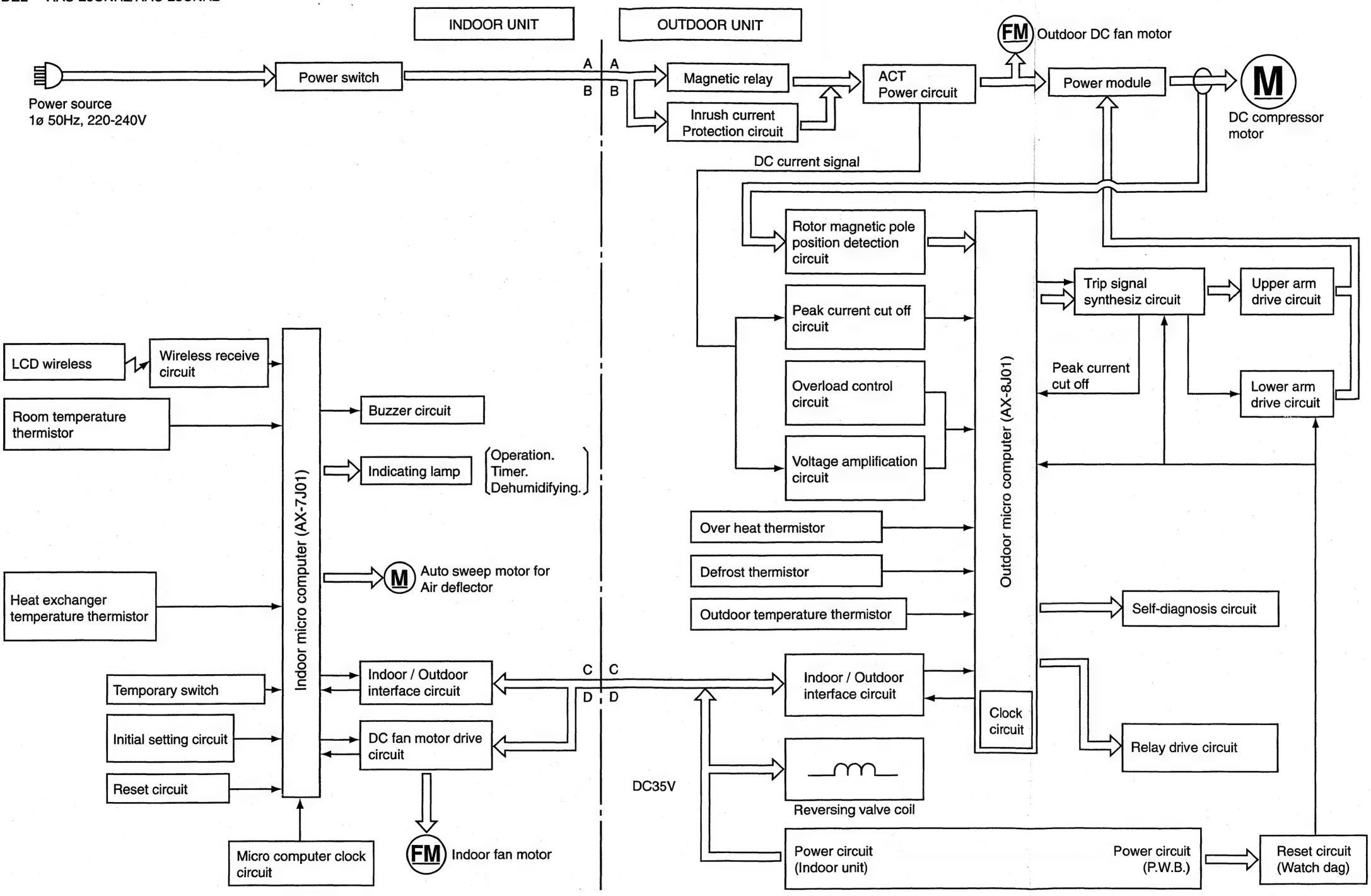
SYMBOL	MODEL NO.	FORM
L101	82µH, 1.3A	H
L102	550µH, 0.6A	H
L901	450µH, 1.5A	H

CONNECTOR

SYMBOL	MODEL NO.	COLOR	FORM	REMARKS
CN1	PH 4P	WHITE	H	
CN2	ZR 6P	WHITE	C	MAIN P. W. B.
CN2	ZR 6P	WHITE	C	INDICATING P. W. B.
CN4	ZR 5P	WHITE	C	
CN6	ZR 3P	WHITE	C	
CN7	XH 4P	BLACK	H	
CN8	ZR 4P	WHITE	C	
CN9	XA 4P	WHITE	H	
CN10	XH 3P	WHITE	H	

BLOCK DIAGRAM

MODEL RAS-25CNH2/RAC-25CNH2



DESCRIPTION OF MAIN CIRCUIT OPERATION

Model RAS-25CNH2

1. Reset Circuit

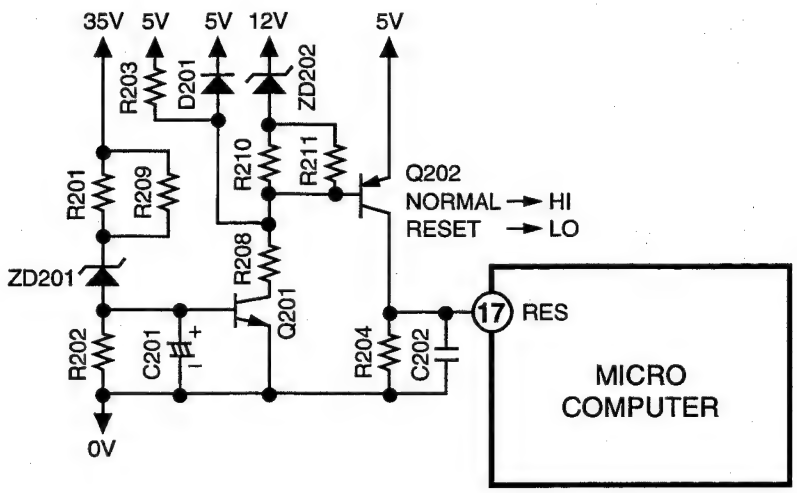


Fig. 1-1

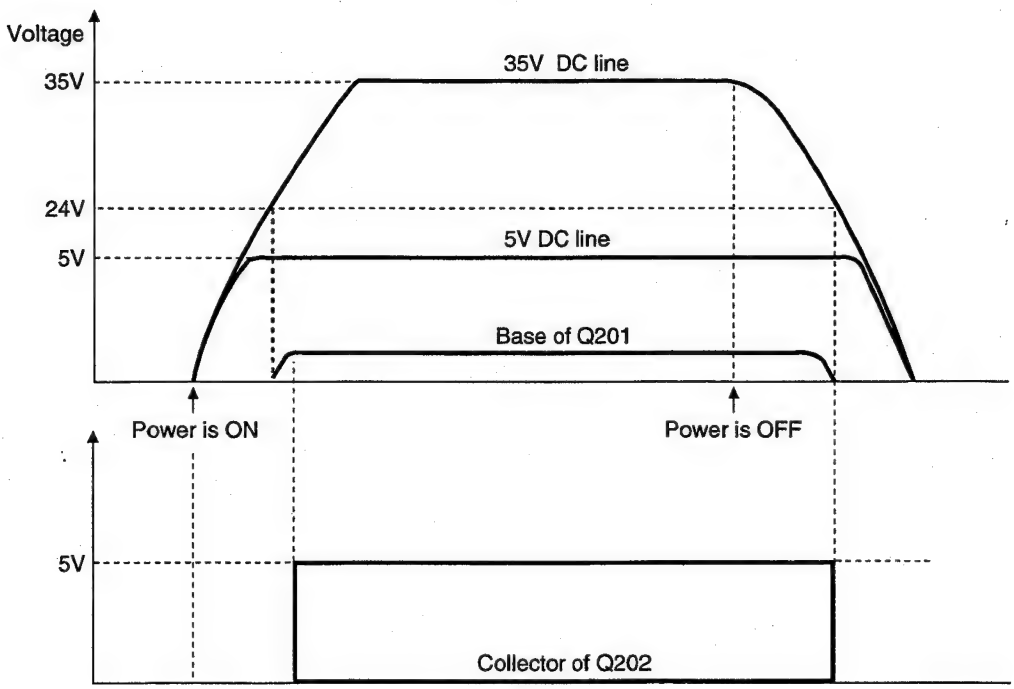


Fig. 1-2

- The reset circuit initializes the program when power is supplied or power is restored following a power failure.
- RESET "Lo" or SET "Hi" activates the micro computer.
- Fig. 1-2 shows the waveforms in each circuit when power is ON and OFF.
- When the power is supplied, the voltages on the 35V and 5V DC lines rise, and when the 35V DC line becomes approx. 24V, ZD201 turns on and the voltage at the base of Q201 rises to turn Q201 on. Since the collector of Q201 goes "Lo" at this time, Q202 turns on and the reset input of the micro computer goes "Hi". The 5V DC line has already been 5V at this time and the micro computer starts operation.
- When power is OFF, the voltage on the 35V DC line drops, and when it is approx. 24V, ZD201 turns off, Q201 and Q202 turn off, and the reset input of the micro computer goes "Lo" to reset it.

2. Receive Circuit

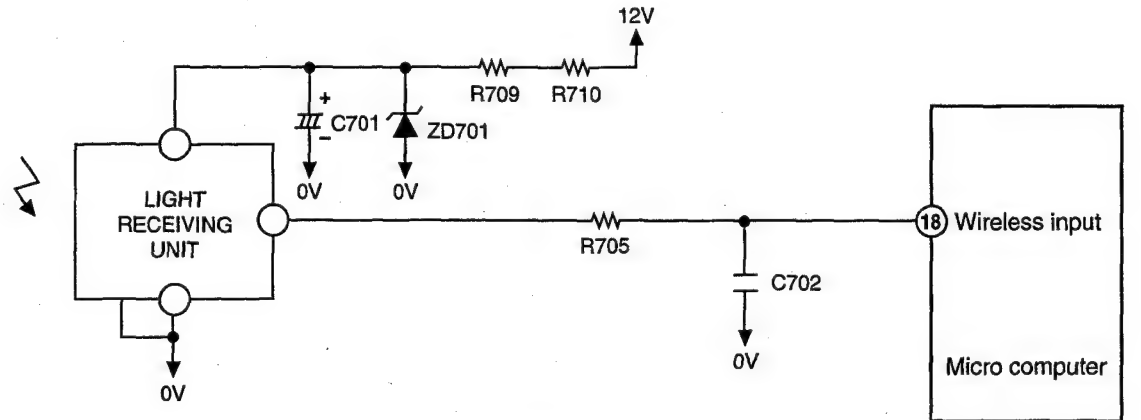


Fig. 2-1

- The Light receiving unit receives an infrared signal from the wireless remote control. The receiver amplifies and shapes the signal and outputs it.

3. Buzzer Circuit

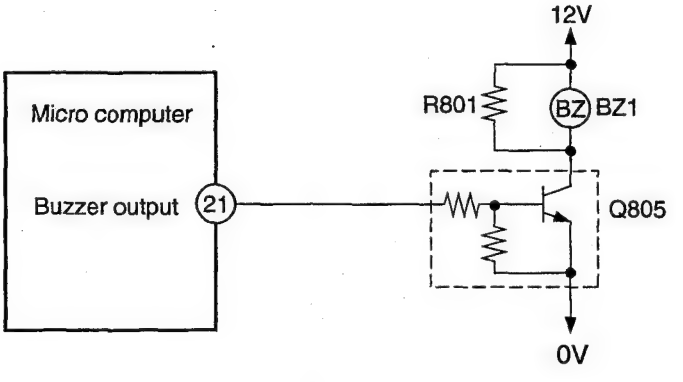


Fig. 3-1 Buzzer Circuit

- When the buzzer sounds, an approx. 3.9kHz square signal is output from buzzer output pin ㉑ of the micro computer. After the amplitude of this signal has been set to 12Vp-p by a transistor, it is applied to the buzzer. The piezoelectric element in the buzzer oscillates to generate the buzzer's sound.

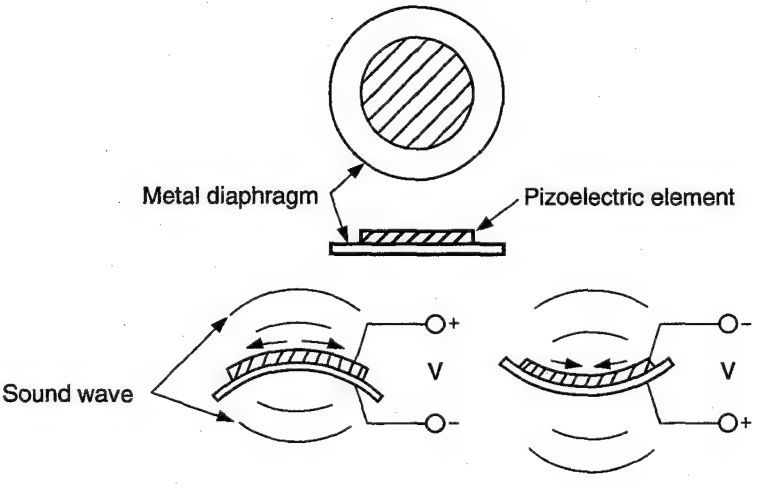


Fig. 3-2 Buzzer Operation

4. Auto Sweep Motor Circuit

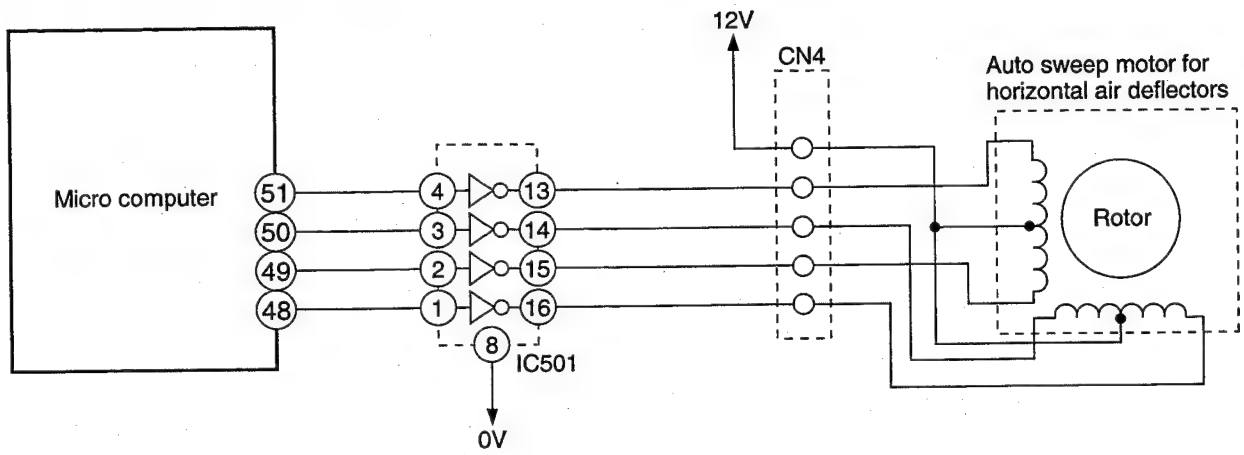


Fig. 4-1 Auto Sweep Motor Circuit (Horizontal air deflectors)

- Fig. 4-1 shows the Auto sweep motor drive circuit; the signals shown in Fig. 4-2 are output from pins ㊽–㊶ of the micro computer.

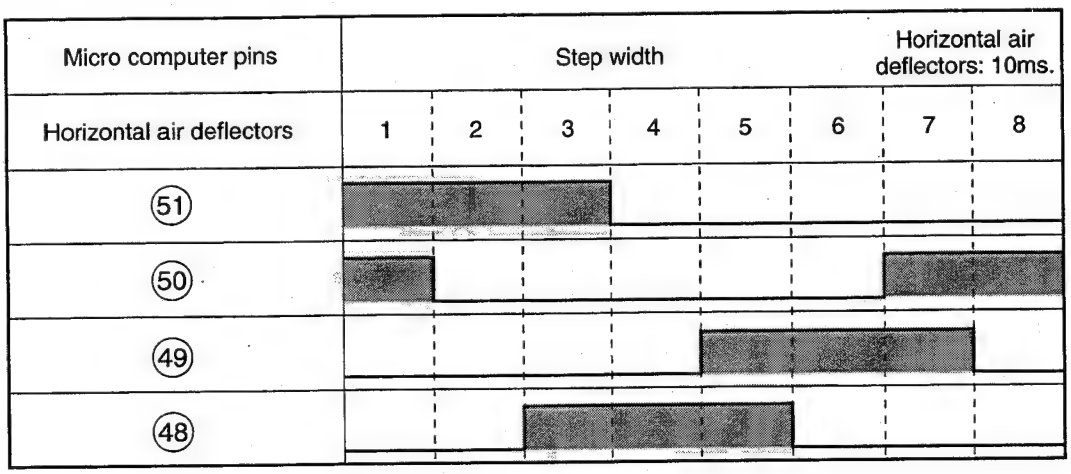


Fig. 4-2 Micro computer Output Signals

- As the micro computer's outputs change as shown in Fig. 4-2, the core of the auto sweep motor is excited to turn the rotor. Table 4-1 shows the rotation angle of horizontal air deflectors.

Table 4-1 Auto sweep Motor Rotation

	Rotation angle per step (°)	Time per step (ms)
Horizontal air deflectors	0.0879	10

5. Room Temperature Thermistor Circuit

- Fig. 5-1 shows the room temperature thermistor circuit.

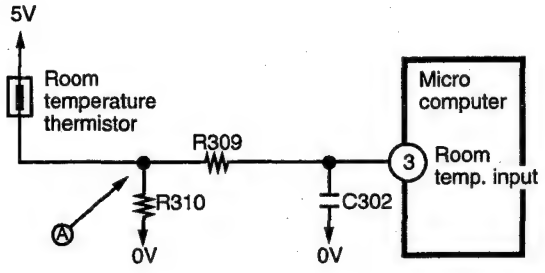


Fig. 5-1

- The voltage at Ⓐ depends on the room temperature as shown in Fig. 5-2.

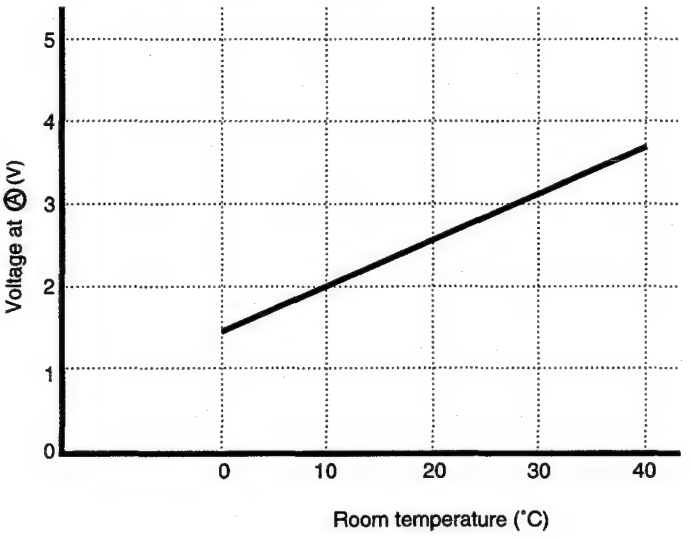


Fig. 5-2

6. Heat exchanger temperature thermistor circuit

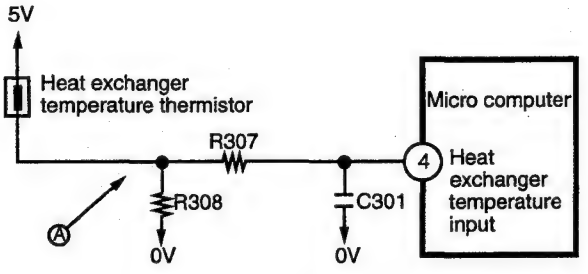


Fig. 6-1

- The circuit detects the indoor heat exchanger temperature and controls the following.

  (1) Preheating.

  (2) Low-temperature defrosting during cooling and dehumidifying operation.

  (3) Detection of the reversing valve non-operation or heat exchanger temperature thermistor open.

  The voltage at Ⓐ depends on the heat exchanger temperature as shown in Fig. 6-2.

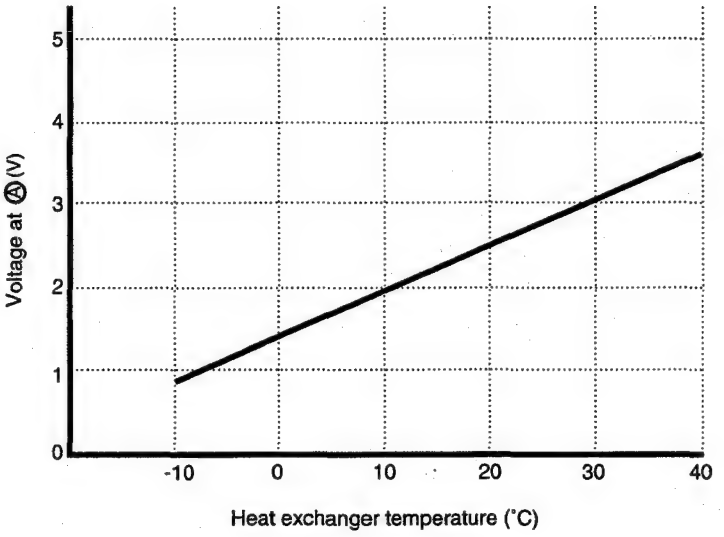


Fig. 6-2

7. Temporary Switch

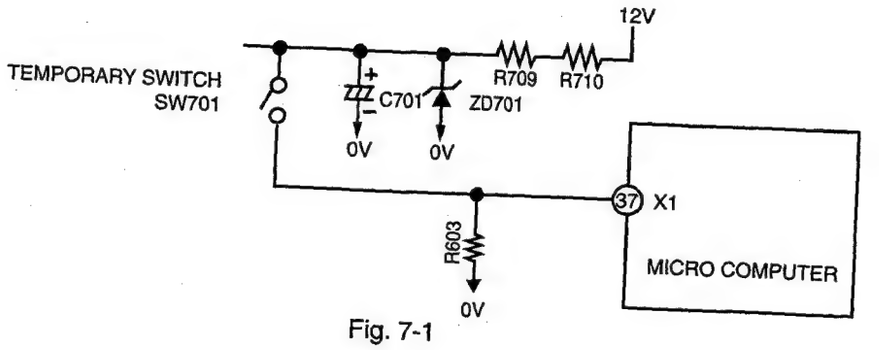


Fig. 7-1

- The temporary switch is used to operate the air conditoner temporarily when the wireless remote control is lost or faulty.
- The air conditioner operates in the previous mode at the previously set temperature. However, when the power switch is set to OFF, it starts automatic operation.

8. DC Fan Motor Drive Circuit

- Fig. 8-1 shows the indoor DC fan motor drive circuit.

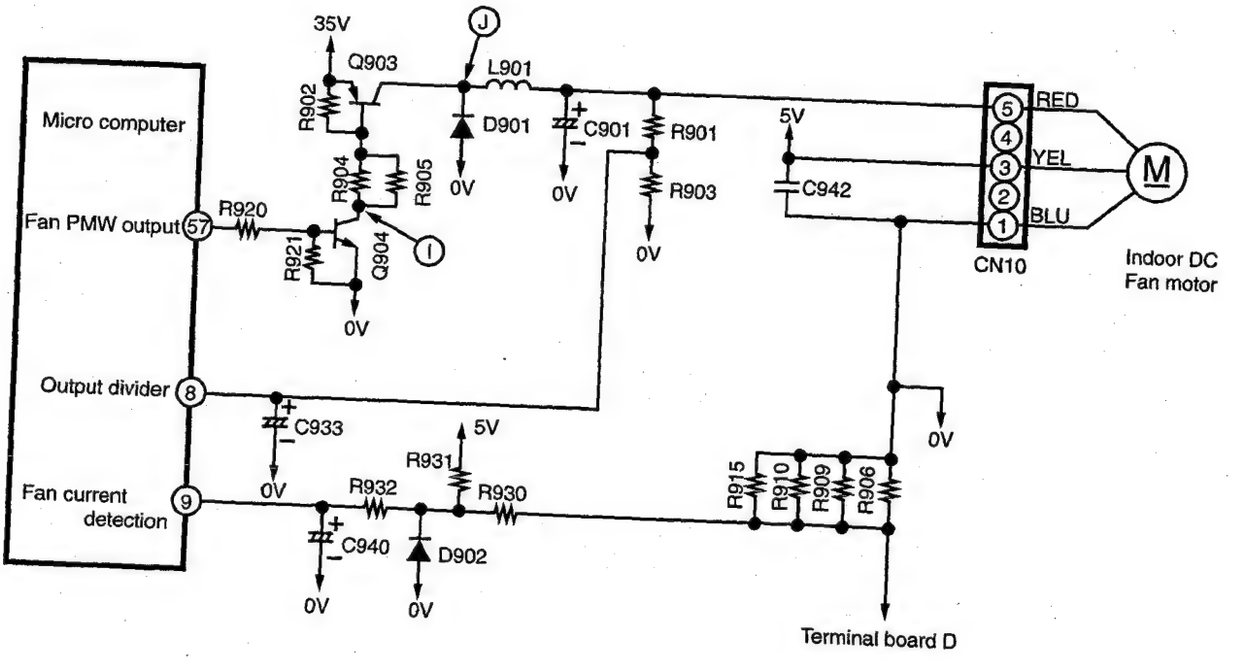


Fig. 8-1

- The circuit produces the fan motor drive voltages, 8-33V, from 35V DC supplied from the outdoor unit and controls the fan motor speed.
- Q903 is switched on and off according to the signal at fan PWM output pin ⑤⑦ to control the voltage which is smoothed by D901, L901 and C901 to drive the fan motor.
- The output voltage is divided by R901 and R903 and is input to divided voltage output pin ⑧; the micro computer controls the fan PWM output so the output voltage is set to the specified value. The chopper frequency of the fan PWM output is 15.7kHz.
- In the Fan current detection circuit, 35V line current is detected by R906∿R915 and input to fan current detection pin ⑨. Microcomputer detects overcurrent comparing it with the current judgment value corresponding to the fan rotation speed.

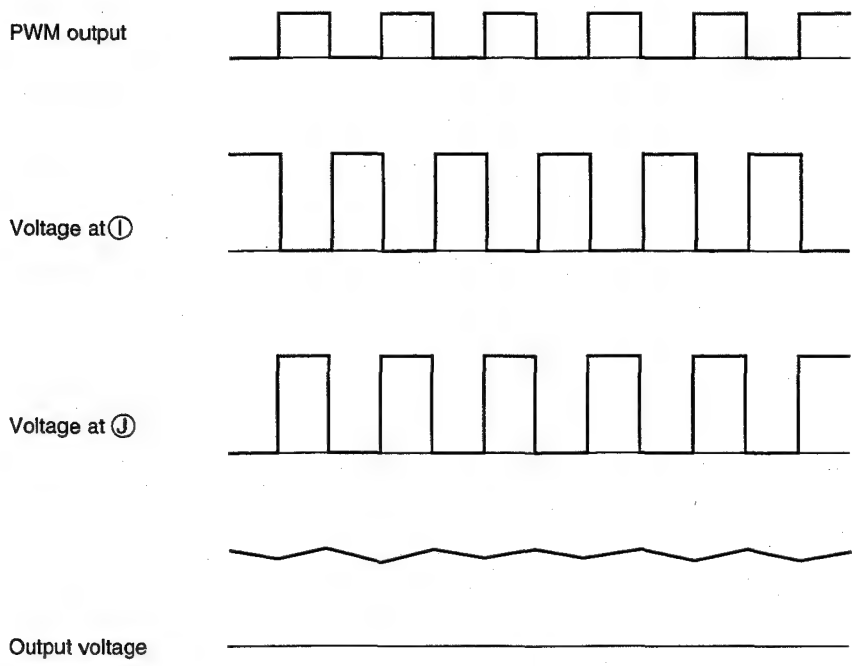


Fig. 8-2

Fan Motor Set Wind Velocity and DC Voltage (between blue and red) Characteristics

Mode		Fan Speed	Connector blue-red voltage (V)	Rotation Speed (min^{-1})
INDOOR FAN SPEED	HEATING	SS	9.8	714
		S	16.6	950
		OVERLOAD	19.1	1,040
		LO	19.1	1,040
		HI	27.7	1,350
		SUPER HI	27.7	1,350
	COOLING	S	16.0	930
		LO	18.7	1,020
		HI	20.9	1,100
		SUPER HI	20.9	1,100
	DEHUMIDIFYING	S	16.0	930

9. 12V Power Circuit

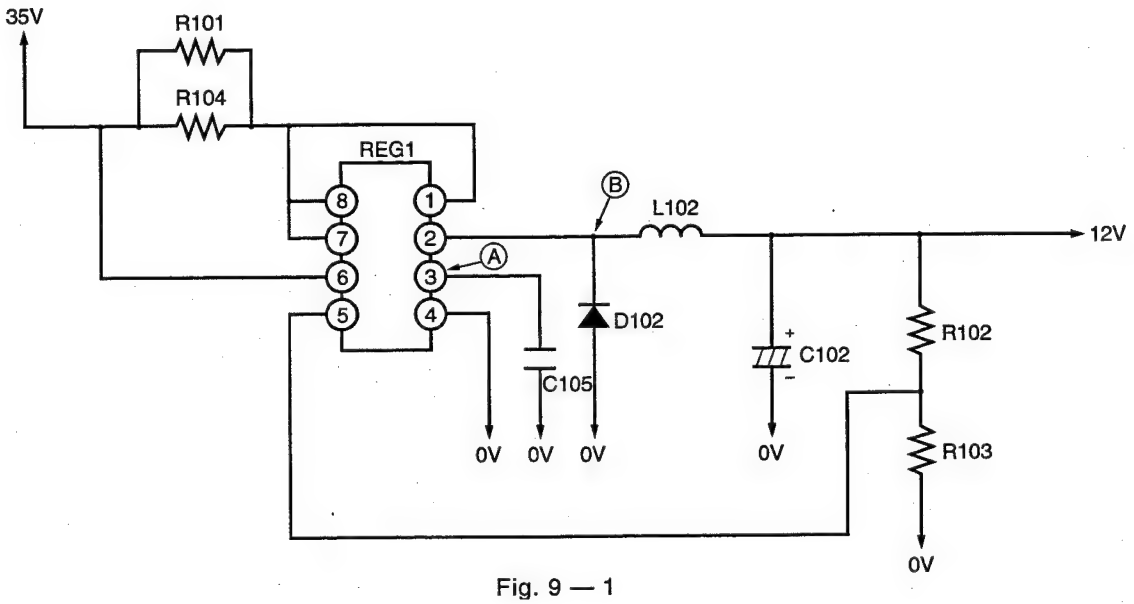


Fig. 9 — 1

- DC 35V supplied from the outdoor unit is controlled by switching of regulator 1, and is smoothed by D102, L102 and C102 to produce 12V.

- Output voltage is divided by R102 and R103, and input to output dividing pin ⑤ to control switching, so that output voltage is 12V.

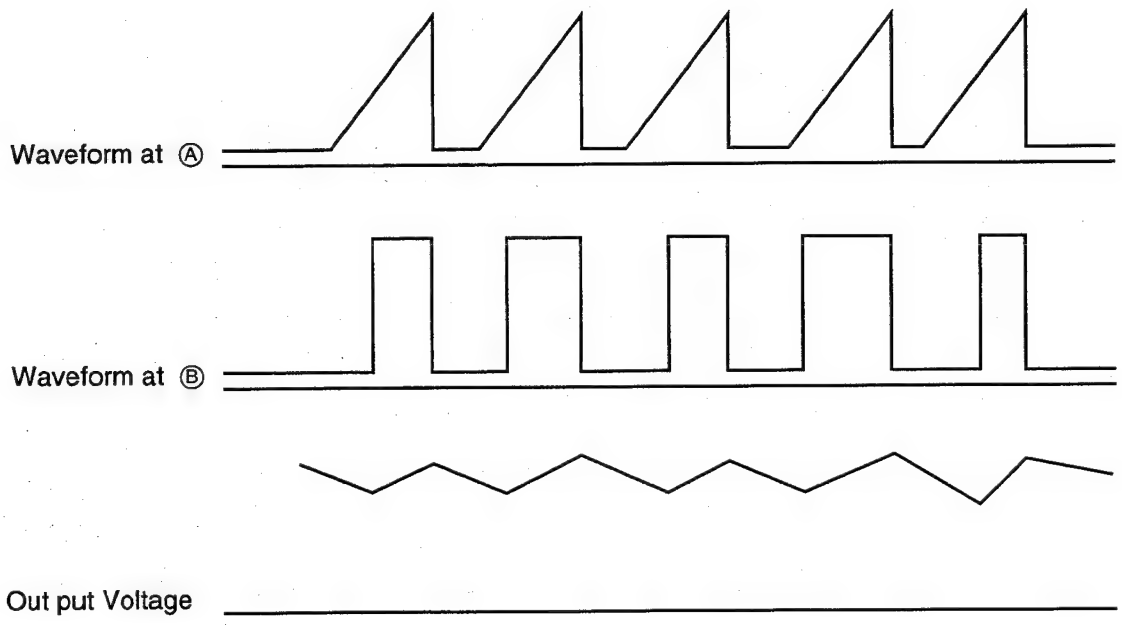


Fig. 9 — 2

Model RAC-25CNH2

1. Power Circuit

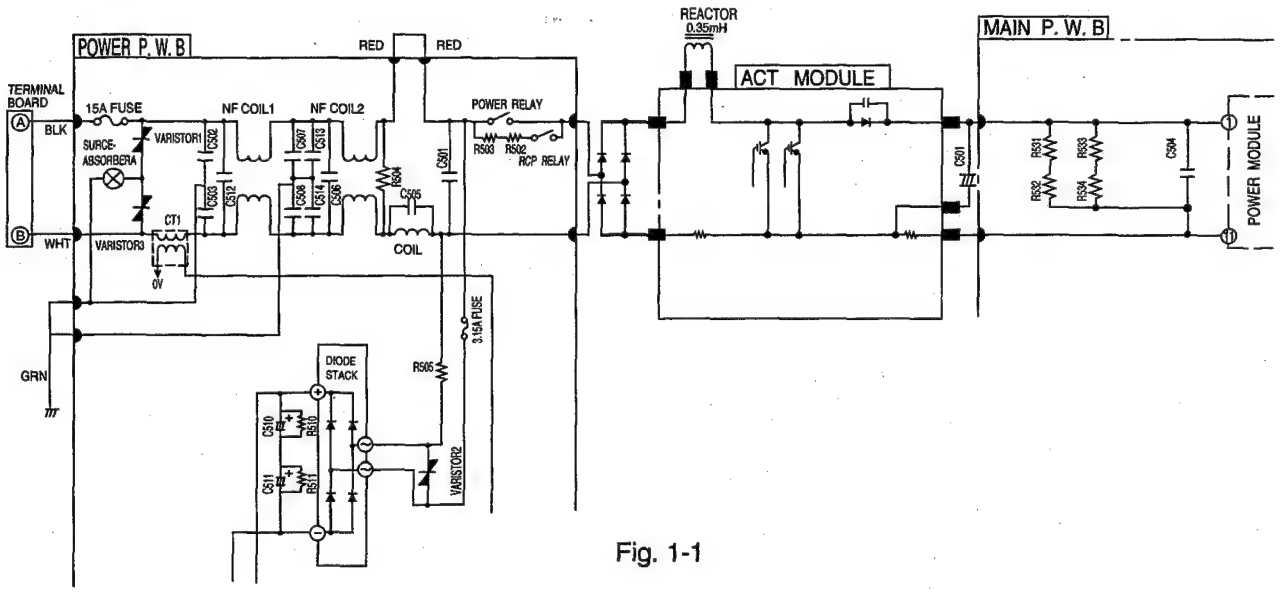


Fig. 1-1

- This circuit full-wave rectifies 220-240V AC applied between terminals A and B, and boosts it to a required voltage with the active module, to create a DC voltage.

The voltage becomes 260-380V when the compressor is operated

(1) Active module

The active filter, consisting of a reactor and switching element, eliminates higher harmonic components contained in the current generated when the compressor is operated, and improves the power-factor.

(2) Diode stacks

These rectify the 220-240V AC from terminals A and B to a DC power supply.

< Reference >

- In case of malfunction or defective connection: Immediately after the compressor starts, it may stop due to "abnormally low speed" active error, etc.

  The compressor may continue to operate normally, but the power-factor will decrease, the operation current will increase, and the overcurrent breaker of the household power board will probably activate.

- In case of active module faulty or defective contact:

  Although the compressor continues to operate normally, the power-factor will decrease, the operation current will increase, and the overcurrent breaker of the household power board will probably activate.

< Reference >

- If diode bridge 1 is faulty, the compressor may stop due to "lp", "anbormally low speed", etc. immediately after it starts, or it may not operate at all because no DC voltage is generated between the positive ⊕ and negative ⊖ terminals.

  If diode bridge 1 is faulty, be aware that the 25A fuse might also have blown.

- If diode bridge 2 is faulty, DC voltage may be not generated and the compressor may not operate at all. Also, be aware that the 3A fuse might have blown.

(3) Smoothing capacitor (C501)

This smoothes (averages) the voltage rectified by the diode stacks.

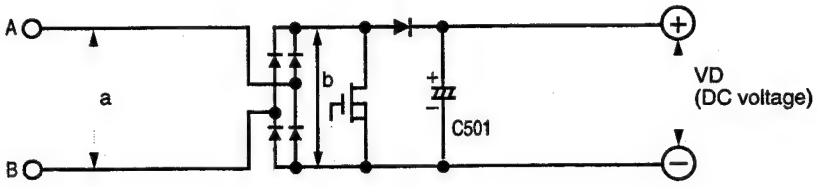


Fig. 1-2

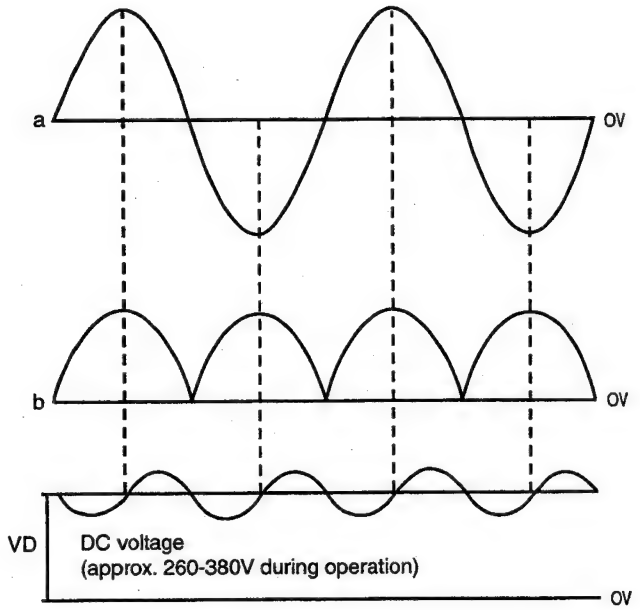


Fig. 1-3

- Be careful to avoid an electric shock as a high voltage is generated. Also take care not to cause a short-circuit through incorrect connection of test equipment terminals. The circuit board could be damaged.

(4) Smoothing capacitor (C501)
This smoothes (averages) the voltage rectified by the diode stacks.
A DC voltage is generated in the same way as in Fig. 1-3.

(5) C507, C508, C512, C513, C506, NF COIL1, NF COIL2, C502, C503, C514
These absorb electrical noise generated during operation of compressor, and also absorb external noise entering from power line to protect electronic parts.

(6) Surge absorber, varistor 1, 2, 3
These absorbs external power surge.

(7) Inrush protective resistor
This works to protect from overcurrent when power is turned on.

< Reference >

- When inrush protective resistor is defective, diode stack may malfunction. As a result, DC voltage is not generated and no operation can be done.

2. Indoor/Outdoor Interface Circuit

- The interface circuit superimposes an interface signal on the 36V DC line supplied from the outdoor unit to perfom communications between indoor and outdoor units. This circuit consists of a transmiting circuit which superimposes an interface signal transmit from the micro computer on the 36V DC line and a transmiting circuit which detects the interface signal on the 36V DC line and outputs it to the micro computer.
- Communications are performed by mutually transmiting and receiving the 4-frame outdoor request signal one frame of which consists of a leader of approx. 100 ms., start bit, 8-bit data and stop bit and the command signal with the same format transmit from the indoor unit.
- From outdoor microcomputer to indoor microcomputer

  The request signal output from microcomputer pin 70 is input to the transmitting circuit. The transmitting circuit outputs an approx. 38-kHz high-frequency signal via pin 11 and continues the output intermittently according to the request signal. This high-frequency signal is amplified by a transistor, superimposed on the DC 36V line via C801 and L701, and supplied to the indoor unit.

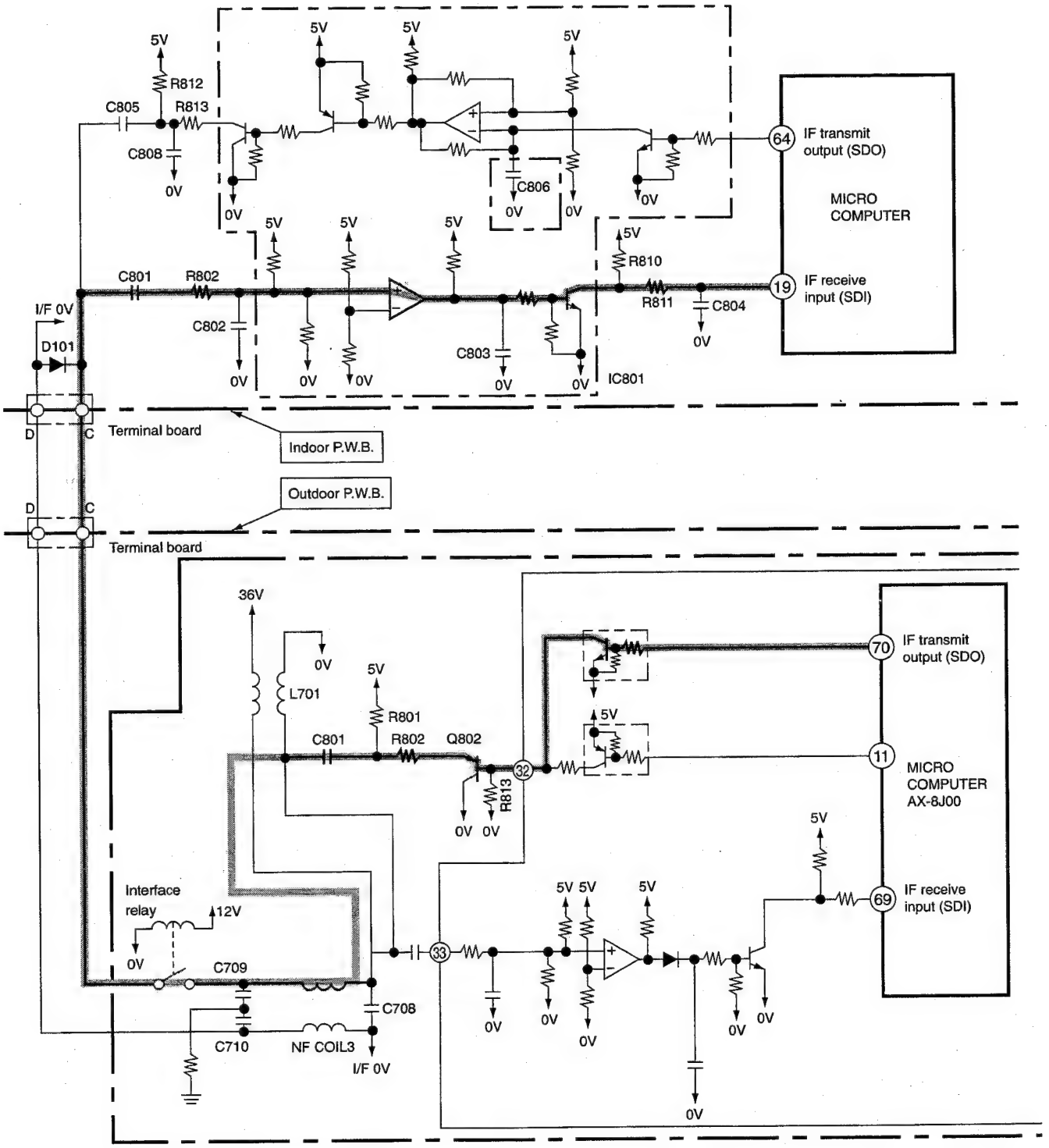
  To prevent erroneous reception, the outdoor microcomputer is designed so that it cannot receive a signal while it is outputting a request signal.

  The receiving circuit in the indoor unit consists of a comparator and transistor. The interface signal from the outdoor unit on the DC 36V line is supplied to C811, where DC components are eliminated, and is then shaped by the comparator. The shaped signal is detected by diode, amplified by amp, and supplied to receiving input 19 of the indoor microcomputer.

  Fig. 2-2 shows the voltages at each component when data is transferred from the outdoor microcomputer to the indoor microcomputer.
- Indoor micro computer to outdoor micro computer

  The communications from the indoor micro computer to the outdoor micro computer are the same. Fig. 2-3 shows the voltages and waveforms at each circuit.

- Fig. 2-1 shows the interface circuit used for the indoor and outdoor micro computers to communicate with each other.



(Communications from indoor micro computer to outdoor micro computer)

(Communications from outdoor micro computer to indoor micro computer)

Fig. 2-1 Indoor/outdoor interface Circuit

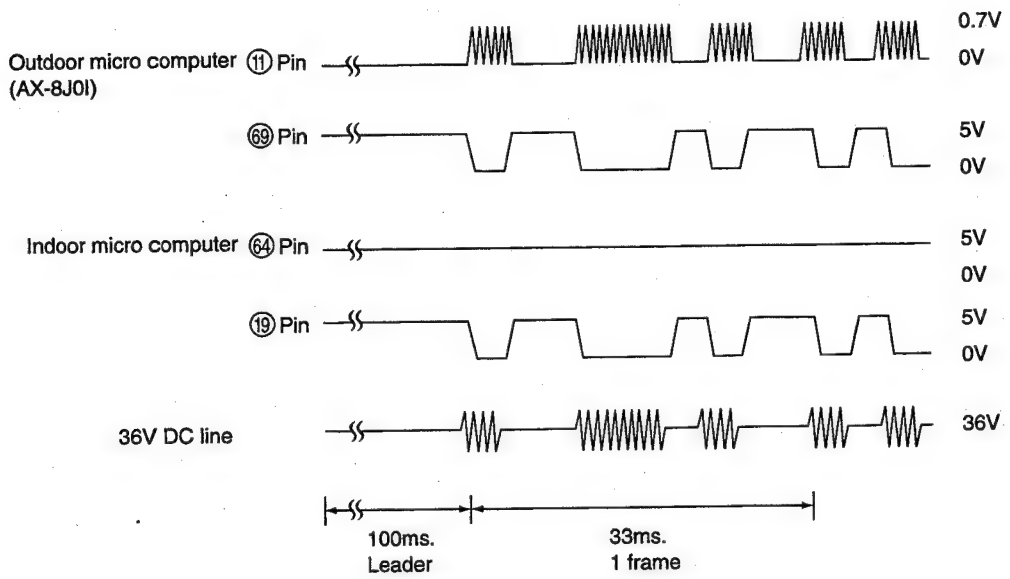


Fig. 2-2 Voltages Waveforms of indoor / Outdoor Micro computers (Outdoor to Indoor Communications)

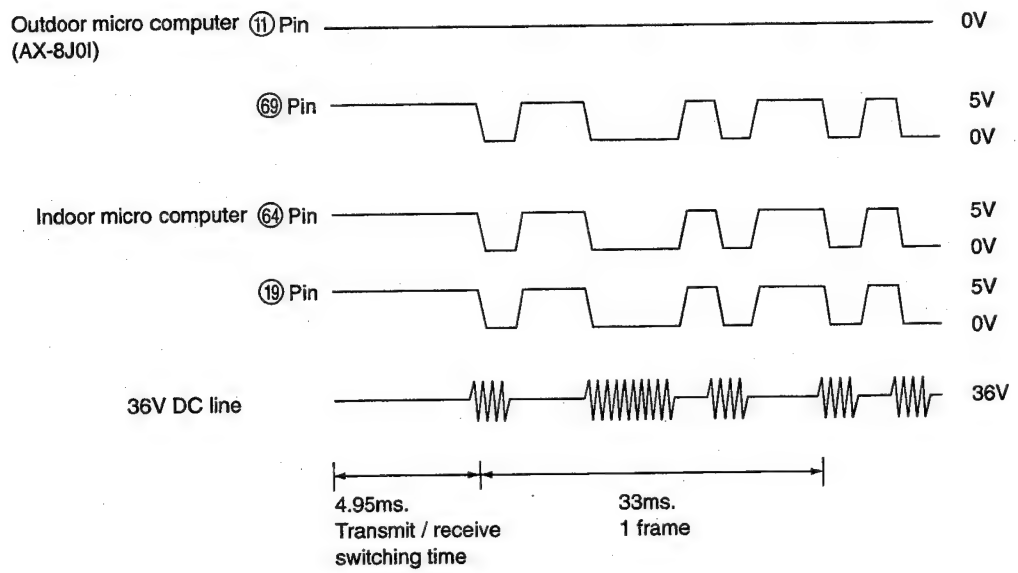


Fig. 2-3 Voltages Waveforms of indoor / Outdoor Micro computers (Indoor to Outdoor Communications)

[Serial Communications Format during Normal Communications]

(1) Outdoor micro computer (AX-8J01) to indoor micro computer

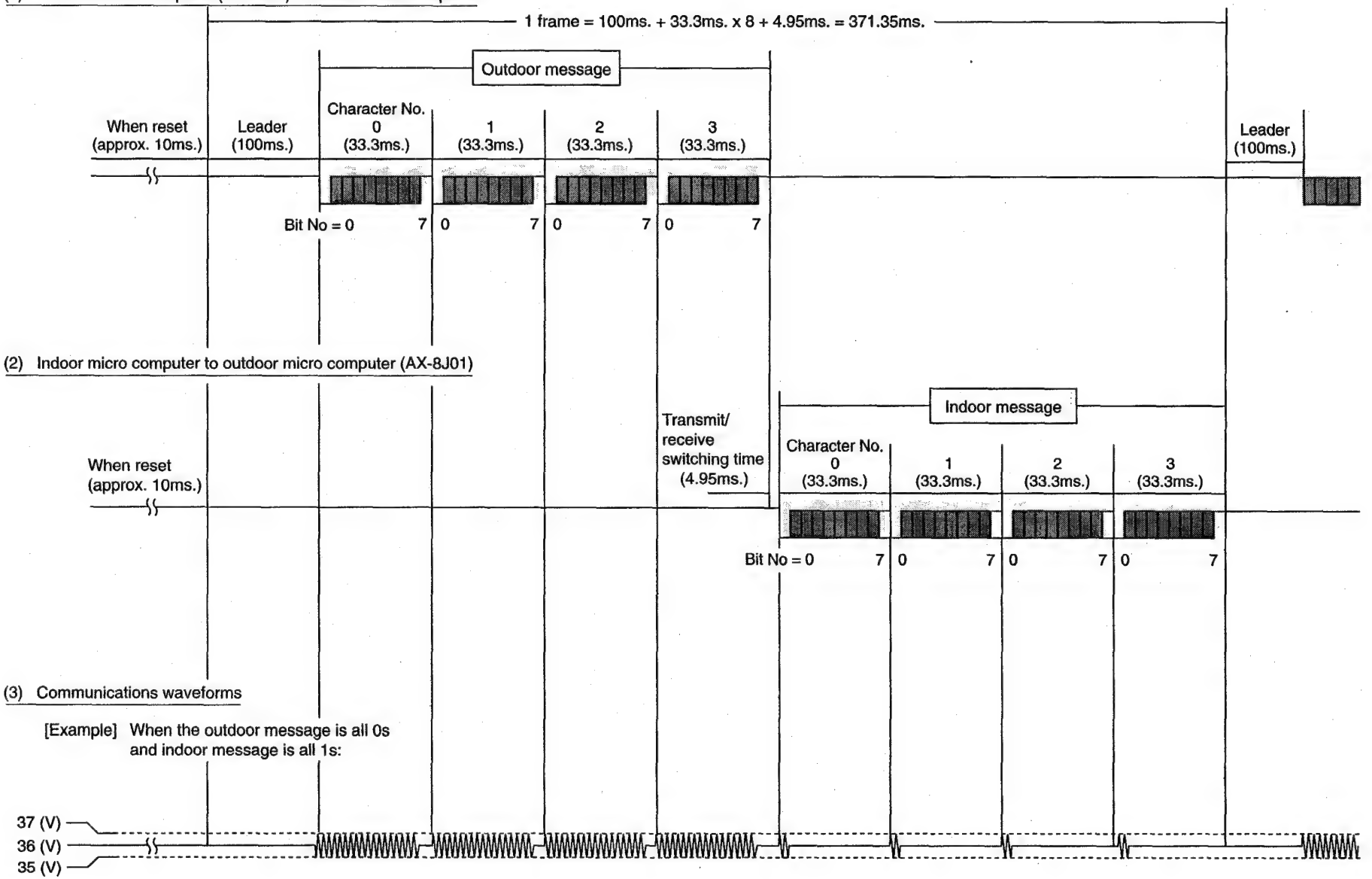


Fig. 3-4

[Serial Communications Data]

(1) Outdoor message

Character No.	Bit No.	Contents	Data
0	0	Multi-bit	1/0
	1		0
	2	During forced operation	1/0
	3	Defrost request signal	1/0
	4	Self-diagnosis (0 LSB)	1/0
	5	Self-diagnosis (1)	1/0
	6	Self-diagnosis (2)	1/0
	7	Self-diagnosis (3 MSB)	1/0
1	0	Outside temperature (0 LSB)	1/0
	1	Outside temperature (1	1/0
	2	Outside temperature (2)	1/0
	3	Outside temperature (3)	1/0
	4	Outside temperature (4)	1/0
	5	Outside temperature (5)	1/0
	6	Outside temperature (6)	1/0
	7	Outside temperature (7 MSB)	1/0
2	0	Compressor during operation	1/0
	1	Compressor during operation	1/0
	2	Actual compressor rotation speed (0 LSB)	1/0
	3	Actual compressor rotation speed (1)	1/0
	4	Actual compressor rotation speed (2)	1/0
	5	Actual compressor rotation speed (3)	1/0
	6	Actual compressor rotation speed (4)	1/0
	7	Actual compressor rotation speed (5 MSB)	1/0
3	0		0
	1	Fan-7-step request	1
	2		0
	3		0
	4		0
	5		0
	6		0
	7		0

(2) Indoor message

Character No.	Bit No.	Contents	Data
0	0	Operation mode (0 LSB)	1/0
	1	Operation mode (1)	1/0
	2	Operation mode (2 MSB)	1/0
	3	Indoor in-operation bit	1/0
	4	Capacity code (0 LSB)	1/0
	5	Capacity code (1)	1/0
	6	Capacity code (2)	1/0
	7	Capacity code (3 MSB)	1/0
1	0	Fan (0 LSB)	1/0
	1	Fan (1	1/0
	2	Fan (2 MSB)	1/0
	3	2-way valve	1/0
	4	Reversing valve	1/0
	5		0
	6	Prohibit the compressor	1/0
	7	Compressor ON	1/0
2	0	Compressor command speed (0 LSB)	1/0
	1	Compressor command speed (1)	1/0
	2	Compressor command speed (2)	1/0
	3	Compressor command speed (3)	1/0
	4	Compressor command speed (4)	1/0
	5	Compressor command speed (5)	1/0
	6	Compressor command speed (6)	1/0
	7	Compressor command speed (7 MSB)	1/0
3	0	15/20(A)	1/0
	1	OVL up	1/0
	2		0
	3	Compressor minimum rotation speed (0 LSB)	1/0
	4	Compressor minimum rotation speed (1)	1/0
	5	Compressor minimum rotation speed (2)	1/0
	6	Compressor minimum rotation speed (3)	1/0
	7	Compressor minimum rotation speed (4 MSB)	1/0

- Fig. 3-1 shows the power module and its peripheral circuit.
  The three transistors on the positive ⊕ side are called the upper arm, and the three transistors on the negative ⊖ side, the lower arm.

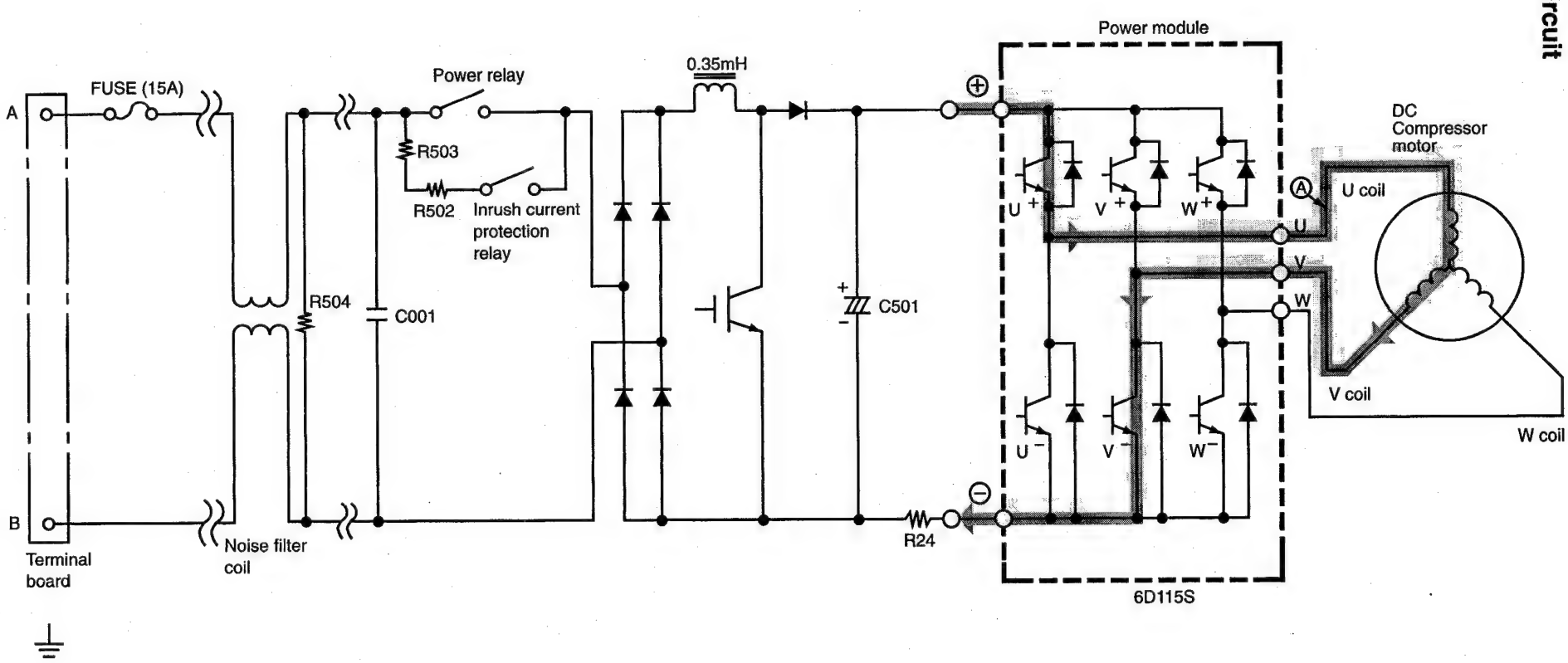


Fig. 3-1 Power module circuit (U^+ is ON, V^- is ON)

- DC 260-380V is input to power module and power module switches power supply current according to rotation position of magnet rotor. The switching order is as shown in Fig. 3-2.

[At point E: U^+ is ON, V^- is ON (circuit in Fig. 3-1)
At point F: U^+ is chopped (OFF), V^- is ON (circuit in Fig. 3-4)]

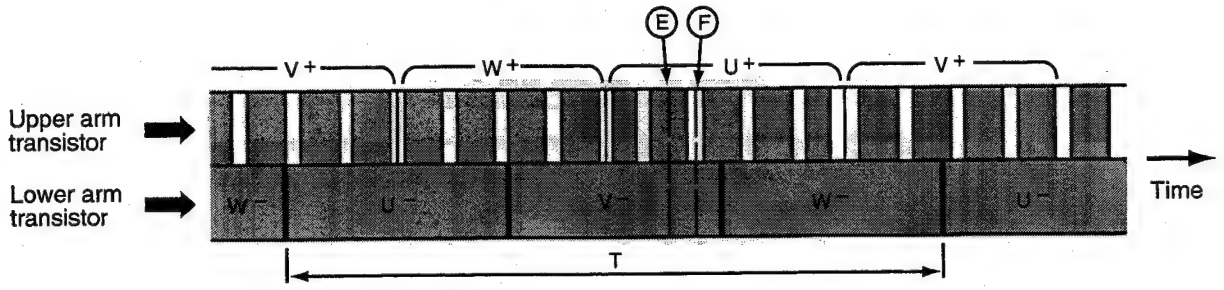


Fig. 3-2 Switching order of power module

- Upper arm transistor is controlled to ON/OFF by 3.2kHz chopper signal. Rotation speed of the compress is proportional to duty ratio (ON time/ ON time + OFF time) of this chopper signal.
- Time T in Fig. 3-2 shows the switching period, and relation with rotation speed (N) of the compressor is shown by formula below;

$$N = 60/2 \times 1/T$$

- Fig. 3-3 shows voltage waveform at each point shown in Figs. 3-1 and 3-4.

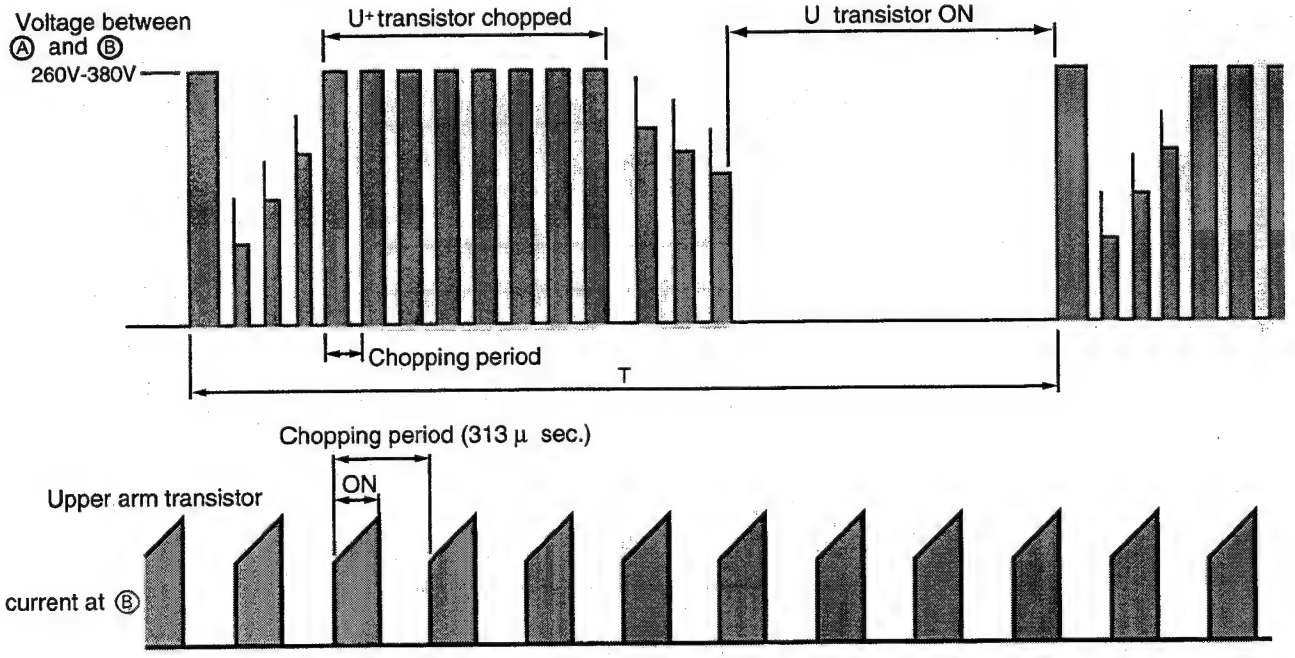


Fig. 3-3 Voltage waveform at each point

- When power is supplied $U^+ \rightarrow U^-$, because of that U^+ is chopped, current flows as shown below; Ⓑ

  (1) When U^+ transistor is ON: U^+ transistor → U coil → V coil → V^- transistor → DC current detection resistor → Point Ⓑ (Fig. 3-1)

  When U^+ transistor is OFF: (by inductance of motor coil) U coil → V coil → V^- transistor → Return diode → Point Ⓐ (Fig. 3-4)

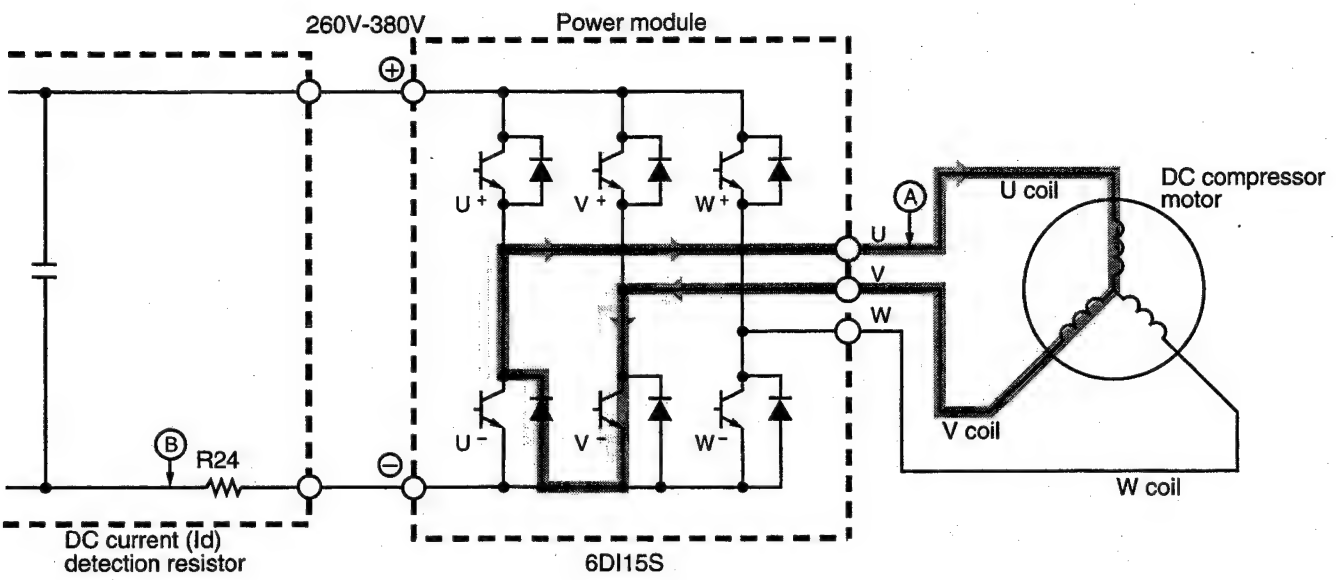


Fig. 3-4 Power module circuit (U^+ is ON, V^- is ON)

- Since current flows at point Ⓑ only when U+ transistor is ON, the current waveform at point Ⓑ becomes intermittent waveform as shown in Fig. 3-3. Since current at point Ⓑ is approximately proportional to the input current of the air conditioner, input current is controlled by using DC current (Id) detection resistor.

<Reference>
If power module is detective, self diagnosis lamps on the control P.W.B. may indicate as shown below:

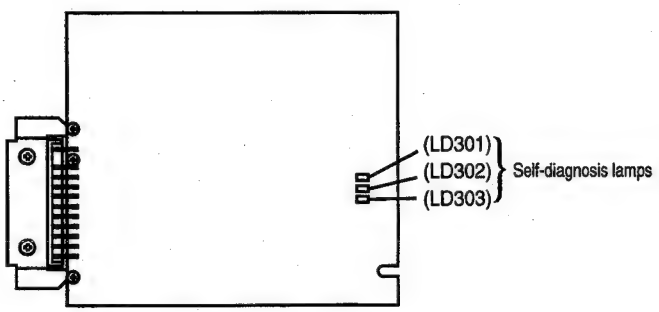


Fig. 3-5

Table 3-1

Self-diagnosis	Self-diagnosis lamp and mode	
Ip (peak current cut)	LD301	Blinks 2 times
Abnormal low speed rotation	LD301	Blinks 3 times
Switching incomplete	LD301	Blinks 4 times

- Simplified check of power module (Lighting mode when operated with compressor leads disconnected)
  (1) Disconnect connector of 3-pole (WHT, YEL, RED) lead wire connecting to compressor located at the lower part of electric parts box.
  (2) Set to compressor operation state (other than FAN mode) and press Start/stop switch of remote control.
  (3) If normal operation continues for more than 1 minute (LD303 lights), power module is considered normal.
  ※ Refer to other item (troubleshooting on page 109) for independent checking of power module.

4. Power Circuit for P.W.B.

- Fig. 4-1 shows the power circuit for P.W.B. and waveform at each point.

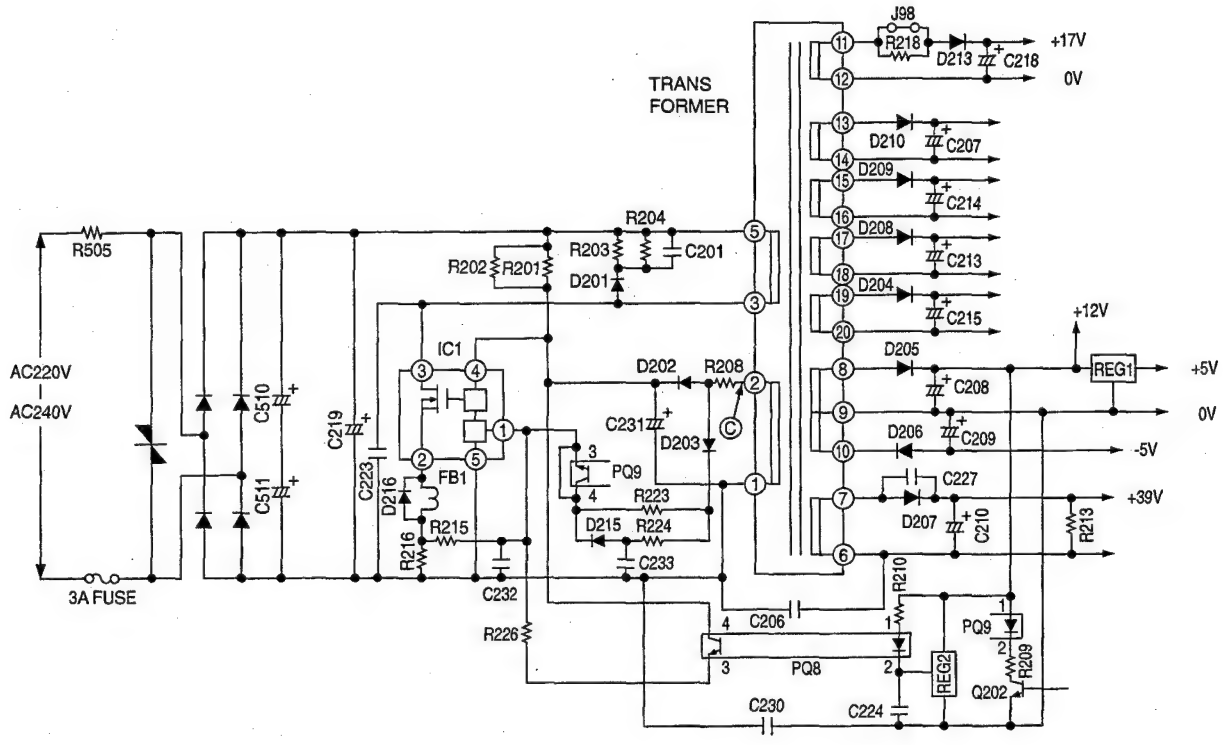


Fig. 4-1 Power circuit for P.W.B.

- In the power circuit for P.W.B., power voltage for microcomputer, peripheral circuits, and power module drive and, as well as DV39V, are produced by switching power circuit.
- Switching power circuit performs voltage conversion effectively by switching transistor IC1 to convert DC300V voltage to high frequency of about 70kHz to 200kHz.
- Transistor IC1 operates as follows:

(1) Shifting from OFF to ON

- DC about 300V is applied from smoothing capacitors C510 ⊕ and 0511 ⊖ in the control power circuit. With this power, current flows to pin ④ of IC1 via R201 and R202 and IC1 starts to tum ON. Since voltage in the direction of arrow generates at point Ⓒ at the same time, current passing through R208 and D202 is positive-fed back to IC1.

(2) During ON

- The drain current at IC1 increases linearly. During this period, the gate voltage and current become constant because of the saturation characteristics of the transformer.

(3) Shifting from ON to OFF

- This circuit applies a negative feedback signal from the 12V output. When the voltage across C208 reaches the specified value, REG2 turns on and current flows to PQ8 ①-②. This turns the secondary circuits on, sets IC1 pin ① to "Hi", and turns IC2 off.

(4) During OFF

- While IC1 is on, the following energy charges the primary windings of the transformer:

  Energy=$LI^2/2$. Here, L : Primary inductance

  I : Current when IC1 is off

  This energy discharges to the secondary windings during power off. That is, C208-C218 is charged according to the turn ratio of each winding.
- At the start, an overcurrent flows to IC1 because of the charged current at C208-C218.
- The drain current at IC1 generates a voltage across R216. If it exceeds the IC1 base voltage, it sets the IC gate voltage to "HI".
- R216 limits the gate voltage to prevent excessive collector current from flowing to IC1.

<Reference>

If the power circuit for P.W.B. seems to be faulty:

(1) Make sure that 5V and 12V on the control P.W.B., upper arm U, V and W, and the lower arm power voltage are the specified values.

(2) When only the 5V output is low:
REG 1 (regulator) faulty, 5V-0V shorted, output is too high, or REG 1 is abnormal.

(3) When 12V and 5V are abnormal:
The following defects can be considered:
① Fan, operation, power, rush prevention relay (shorting in relay, etc.)
② Microcomputer is abnormal.
③ REG 1 (regulator is abnormal), etc.
Shorting on primary circuits.
When shorting occurs in the secondary circuits, there is no abnormality in the primary circuits because of overcurrent protection.
The voltage rises when an opening occurs in the primary circuits, or the feedback system is abnormal.

(4) When upper arm U, V or W phase, or lower arm supply is abnormal:
D204, D208, D209, D210 or drive circuit is abnormal.

(5) When all voltage are abnormal:
IC1, R216, etc. are possibly abnormal.

* If IC1 is abnormal, be aware that other components, such as the power module, REG (regulator), etc. are possibly defective.

[When the switching power supply seems to be abnormal, the voltage between IC1 pin ④ (to be measured at the leads of R202 and R201) and IC1 pin ⑤ (to be measured at R216 lead) may be between 11 and 16V. This is because the protection circuit of IC1 is operating.]

5. Reversing valve control circuit

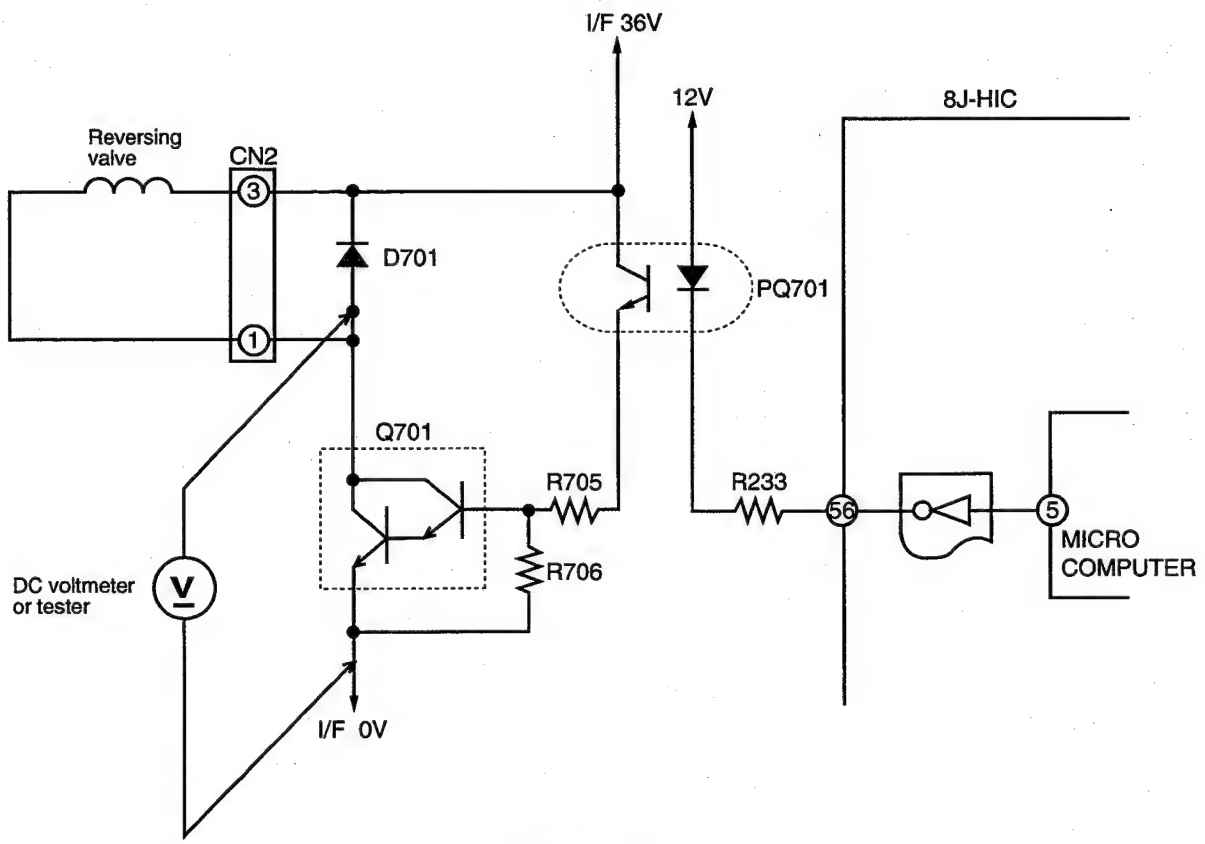


Fig. 5 — 1

❋ Since the reversing valve is differential pressure system, even when reversing valve is ON (collector voltage of Q701 is about 0.8V normally), compressor rotation speed instructed by indoor microcomputer exceeds 3300min^{-1}, signal at pin ⑤ of microcomputer changes, and collector voltage of Q701 will be about 36V.

This does not indicate trouble. When rotation speed is reduced under 2700min^{-1}, collector voltage of Q701 will fall to about 0.8V again. To measure voltage, connect ⊕ terminal of tester to D701 anode and ⊖ terminal to D line on the terminal board.

- By reversing valve control circuit you can switch reversing valve ON/OFF according to instruction from indoor microcomputer and depending on operation condition.

  Voltage at each point in each operation condition is approximately as shown below when measured by tester. (When collector voltage of Q701 is measured)

Table 5-1

Operation condition		Collector voltage of Q701
Cooling	General operation of Cooling	About 36V
Heating	In normal heating operation	About 0.8V
	MAX. rotation speed instructed by indoor microcomputer after defrost is completed	About 0.8V
	Defrosting	About 36V
Dehumidifying	SENSOR DRY	About 36V

6. Rotor Magnetic Pole Position Detection Circuit

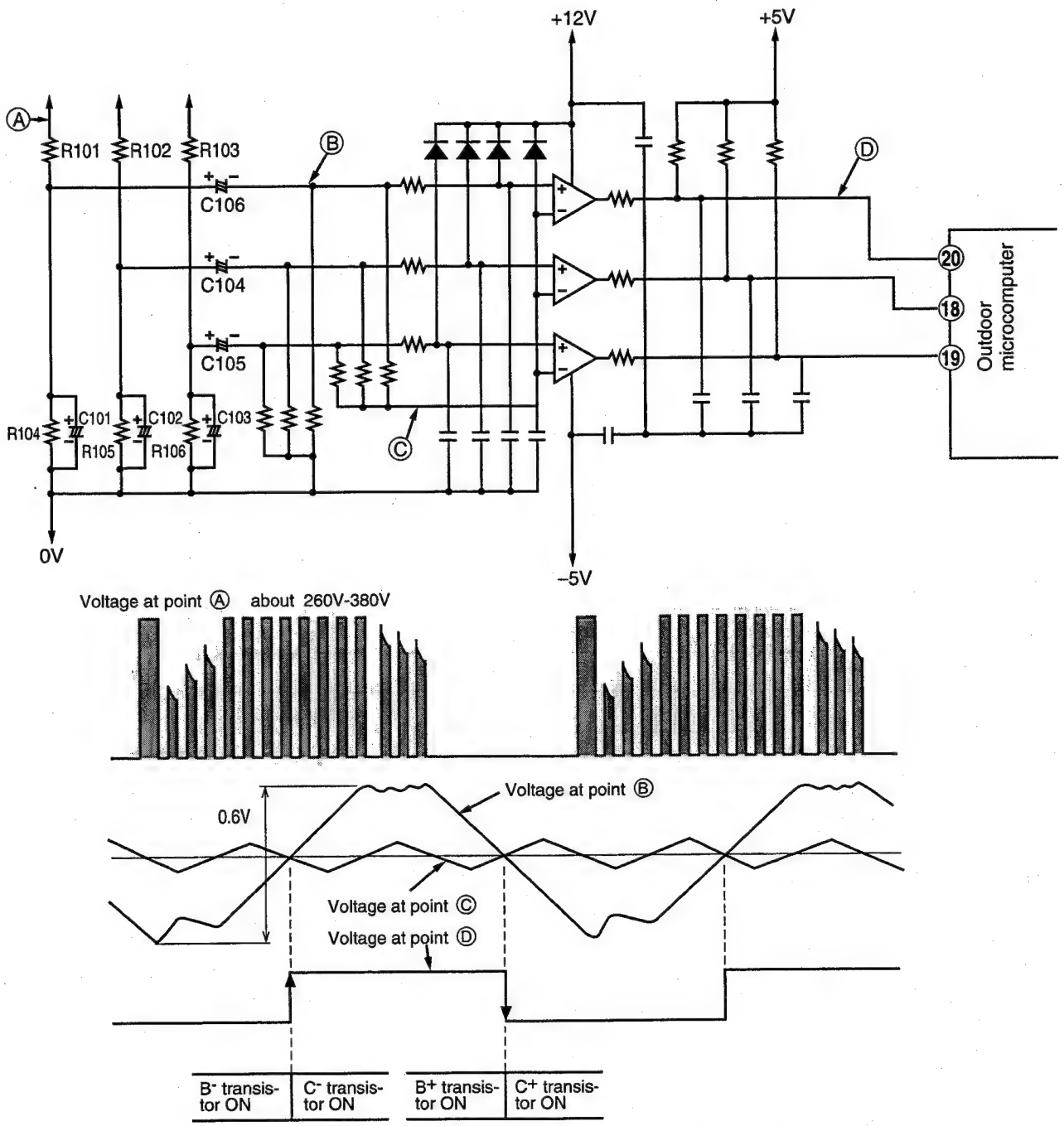


Fig. 6 — 1 Rotor magnetic pole position detection circuit and voltage waveform at each part

- Motor-induced voltage signal (voltage at point Ⓐ) is phase-shifted by 90° by passing lowpass filter consisting of R101, R104 and C101 to make triangular wave (voltage at point Ⓑ). In HIC, 3 phases of this triangular wave are synthesized to produce composite wave (voltage at point Ⓒ). This composite wave becomes a triangular wave with period of 1/3 times compared with original triangular wave.
- Voltages at points Ⓑ and Ⓒ are compared by comparator to make voltage at point Ⓓ.

  Voltage at point Ⓓ is taken into microcomputer and timing of switching from V^- transistor to W^- transistor is made by rising waveform, and timing of switching from V^+ transistor to W^+ transistor is made by failling waveform.
- For other 2 phases (V phase and W phase), the operation is the same and phases are shifted by 120° and 240° respectively compared with U phase waveform.

7. Drive Circuit

(1) Upper Arm Drive Circuit

- Fig. 7-1 shows the upper arm drive circuit.
  The circuit configuration is completely the same for phases A, B and C.

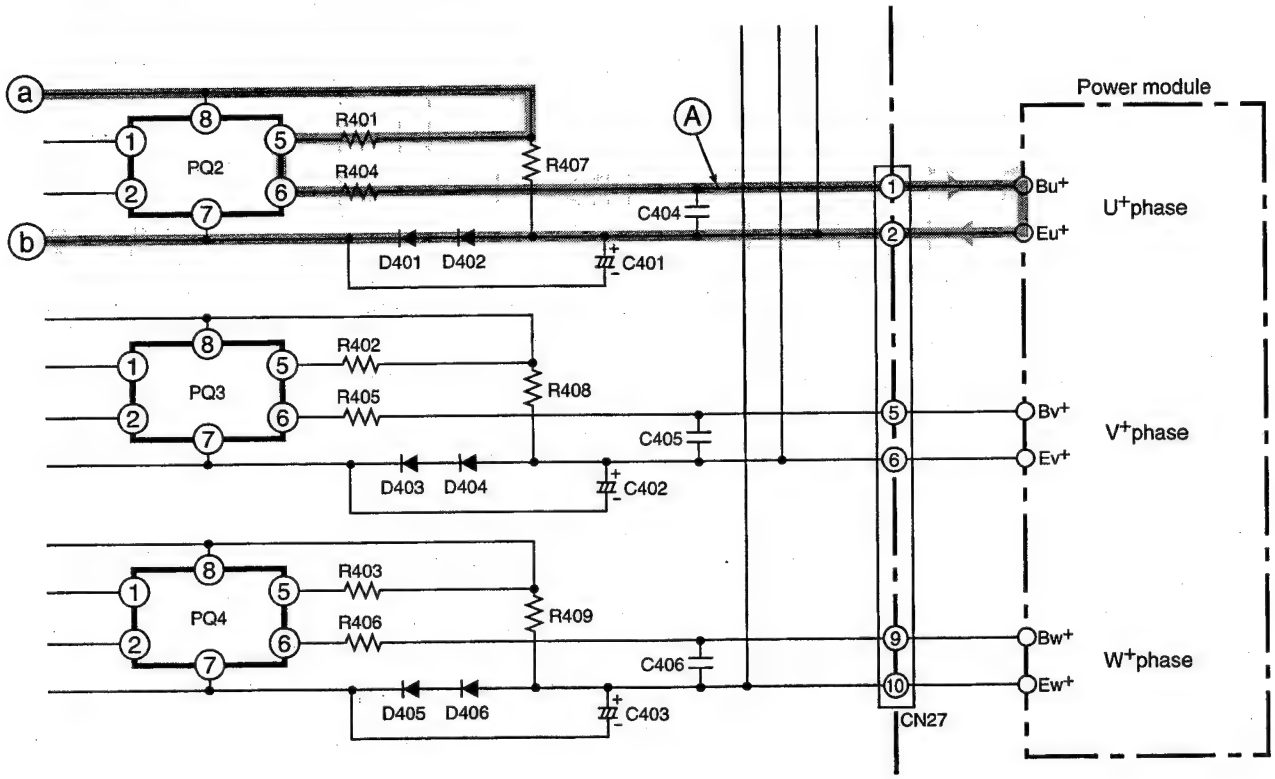


Fig. 7-1

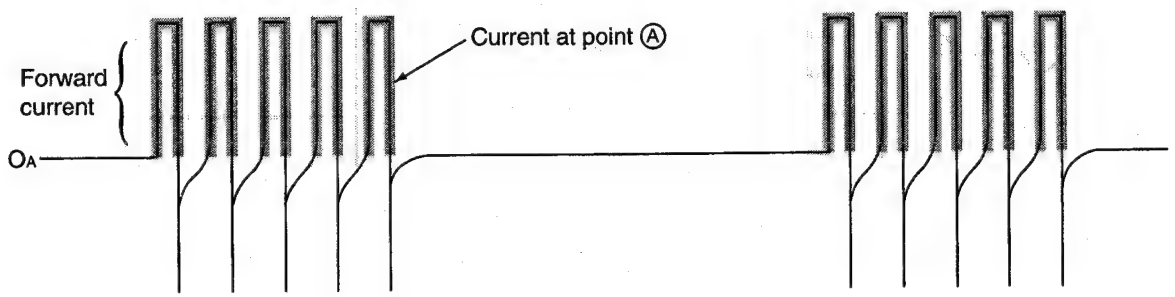
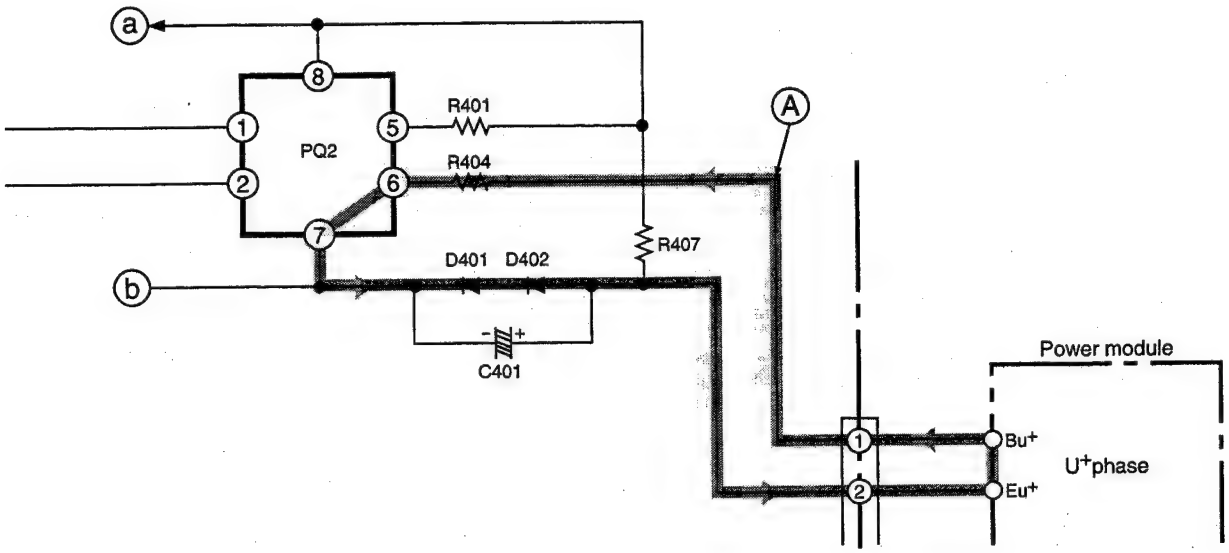


Fig. 7-2 Forward Current Waveform at Point Ⓐ

- When pin ㉓ of the micro computer goes "HI" → "LO", a photocoupler between PQ2 pins ① and ② turns on and current flows to terminal Ⓐ → R401 → PQ2 → R404 → power module's Bu^+ terminals → Eu^+ terminals → D402 → D401 → terminal Ⓑ and drives the upper arm transistors. (Fig.7-2)
- As described in the rotor magnetic pole position detecting circuit, the upper arm drive circuit supplies current to the bases of the transistors on the power module's positive ⊕ side which turn on or off according to the position detection signals. The signals according to the position detection detection signals are output from pins ㉓, ㉔ and ㉕ of the micro computer and are input to pins ② of photocouplers PQ2 - PQ4.

- When pin ㉓ of the micro computer then goes "Lo" → "Hi", a photocoupler between PQ2 pins ① and ② turns off and the reverse bias current flows to C401 → power module's Eu^+ terminals → Bu^+ terminals → R404 → PQ2 to cut off the upper arm transistors. (Fig.7-3)



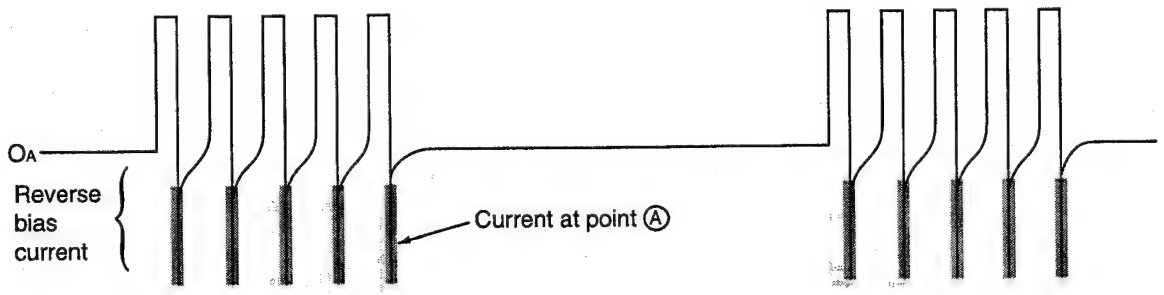


Fig. 7-3 Waveform of Transistor Base Current (Reverse Current at Point Ⓐ)

- R407 is used to charge C401 initally.
- The operation is the same for V^+ and W^+ phases.

(2) Lower Arm Drive Circuit

- Fig. 7-4 shows the lower arm drive circuit.

  The circuit configuration is completely the same for phases A, B and C.

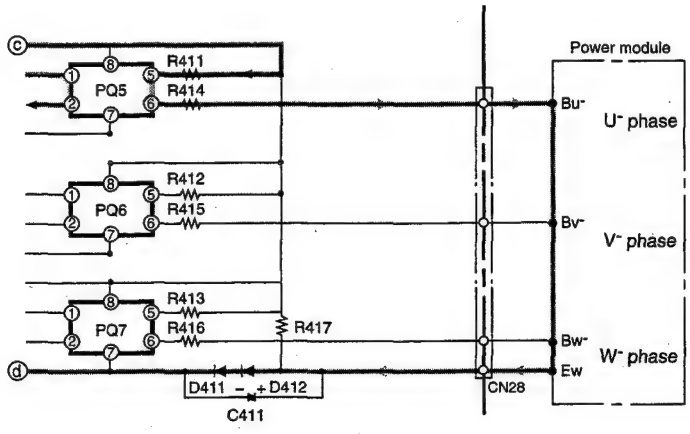


Fig. 7-4

- When pin ㉖ of the micro computer goes "HI" → "LO", a photocoupler. between PQ5 pins ① and ② turns on and current flows to terminal Ⓒ → R411 → PQ5 → R414 → power module's BU^- terminals → Ew^- terminals → D412 → D411 → terminal Ⓓ and drives the lower arm transistors. (Fig. 7-4)
- The signals which turn on or off according to the position detection signals are output from pins ㉖ ㉗㉘ of the micro computer in the same way as in the upper arm drive circuit and are input to pins ② of photocouplers PQ5-PQ7.
- No chopper signal is input to the lower arm drive circuit.

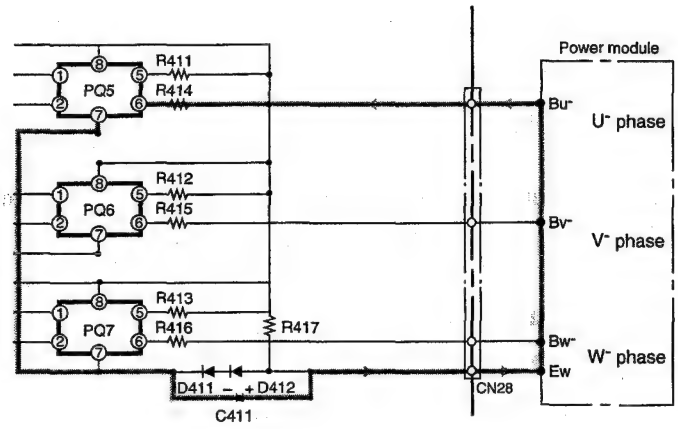


Fig. 7-5

- When pin ㉖ of the micro computer goes "LO" → "HI", a photocoupler between PQ5 pins ① and ② turn off and reverse bias current flows to C411 → power module's Ew^- terminals → Bu^- terminals → R414 → PQ5 to cut off the lower arm transistors. (Fig. 7-5)
- R417 is used to charge C411 initally.
- The operation is the same for V^- and W^- phases.
- When the peak current cut off function operates, Q306, PQ2-PQ4 and PQ5-PQ7 turn off and the upper/ lower arm drive circuits stop.
- Only the lower arm drive circuits turns off when reset.

8. HIC and Peripheral Circuits

- Fig. 8-1 shows the micro computer and its peripheral circuits, Table 8-1, the basic operations of each circuit block, and Fig. 8-2, the system configuration.

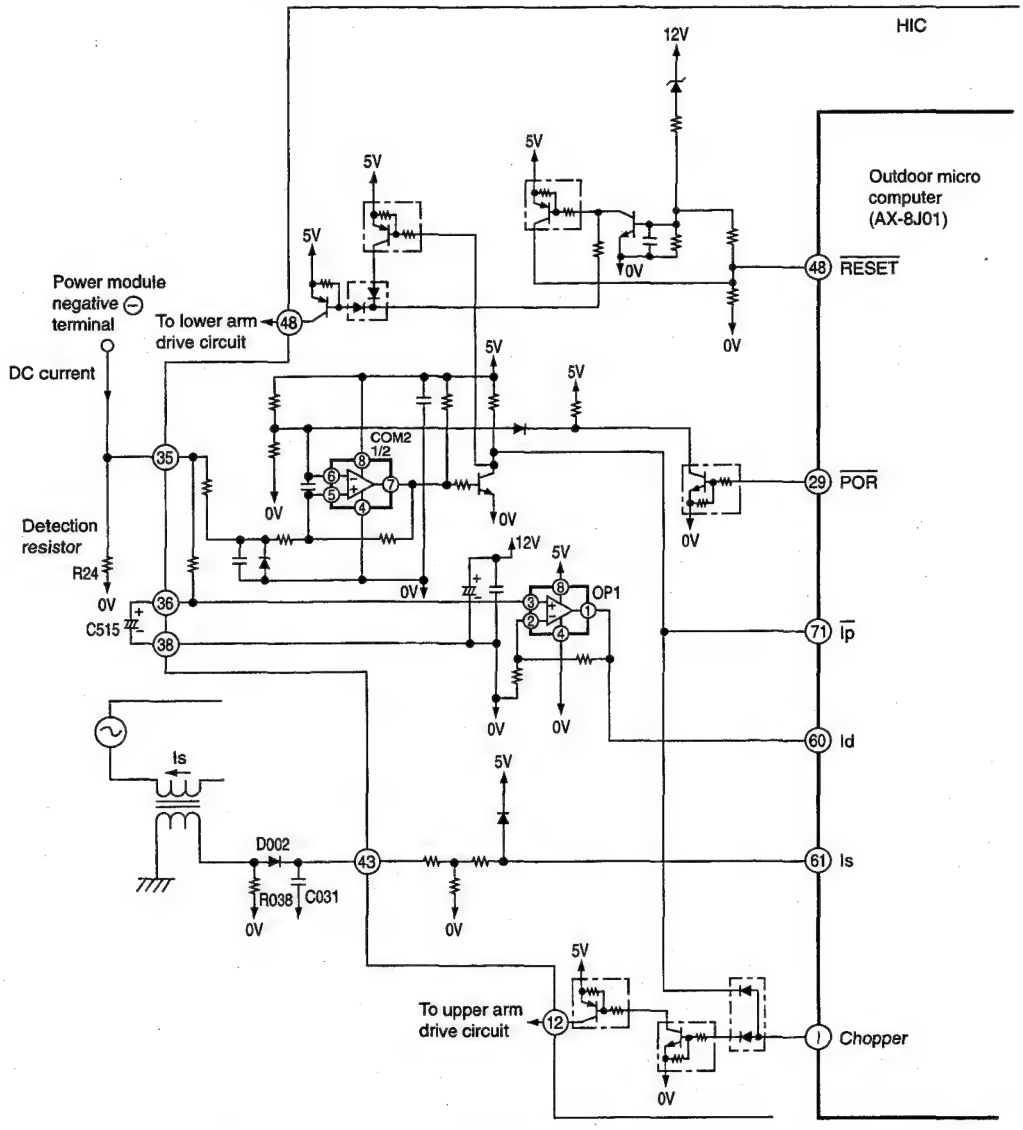


Fig. 8-1 Micro computer (AX-8J01) and Peripheral Circuits

Table 8-1

Circuit block	Basic operation
Peak current cutoff circuit	Detects DC current flowing power module and during overcurrent (instantaneous value) flows, stops upper/lower arm drive circuits and also produces Ip signal by which drive signal output is stopped.
Set value circuit	Compares voltage detected, amplified and input to HIC with set voltage value in microcomputer, and controls overload when set value exceeds input voltage.
Voltage amplifier circuit	Voltage-amplifies DC current level detected by the detection resistor and inputs this to microcomputer. Internal or external overload is judged in microcomputer.
Reset circuit	Produces reset voltage.
Trip signal synthesis circuit	Modulates chopper signal to drive signal and stops according to presence/absence of Ip signal or reset signal.

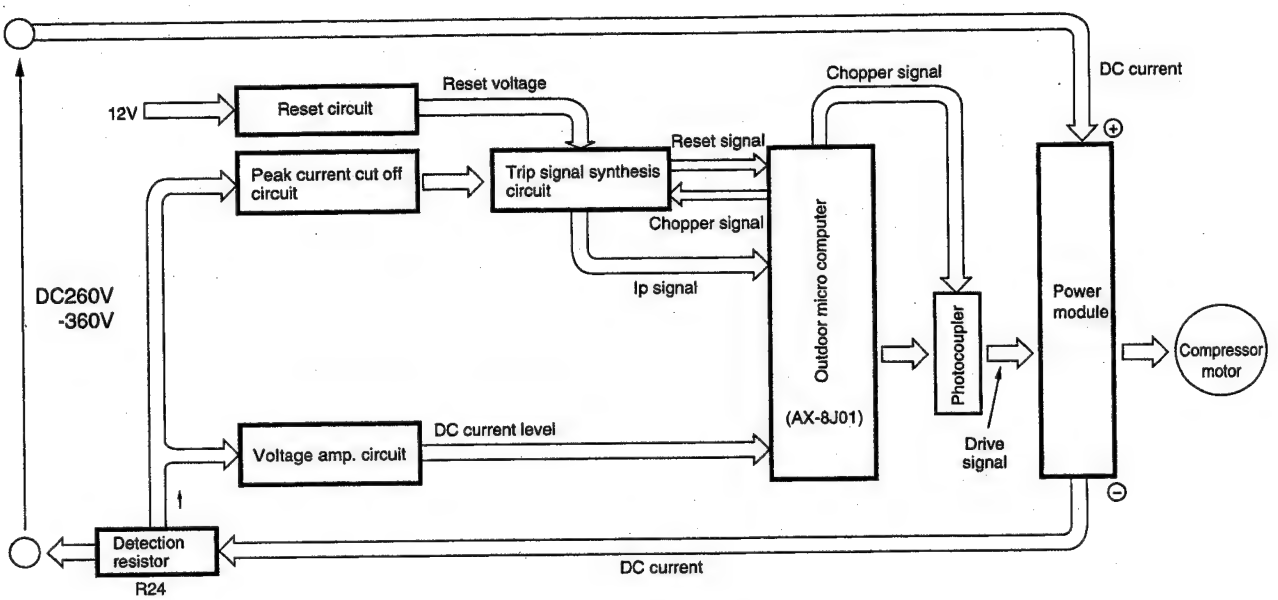


Fig. 8-2

- The following describes the operations of each circuit in detail.

(1) Peak current cut off circuit
Fig.8-3 Peak Current Cut off Circuit and Waveforms at Each Section.

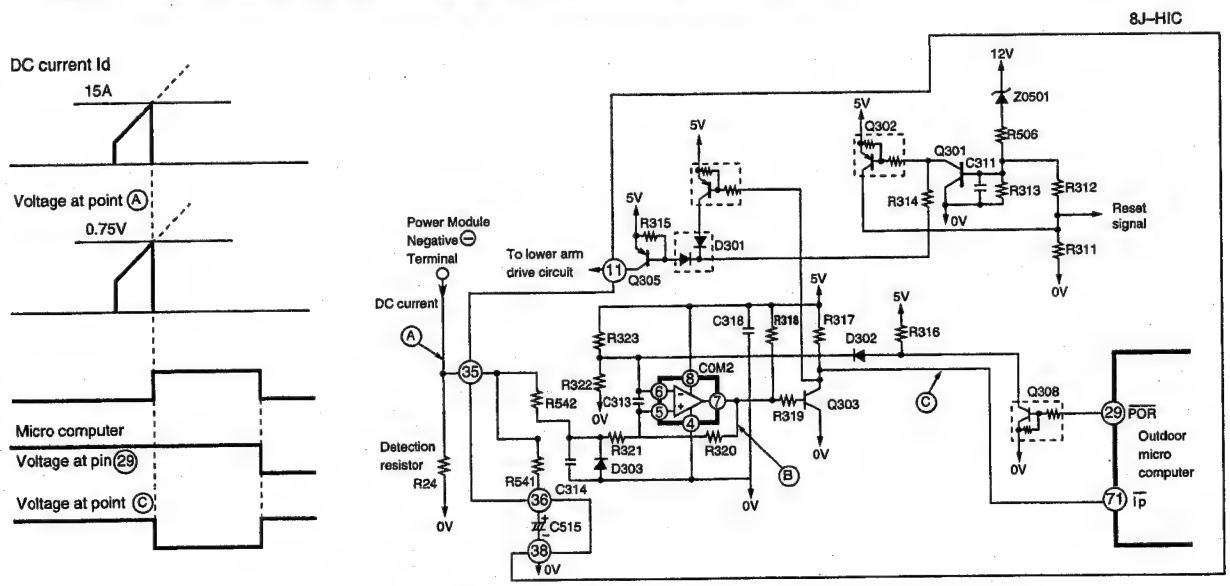


Fig.8-3 Peak Current Cut off Circuit and Waveforms at Each Section

- The Ip cut off circuit detects an instantaneous high-level current and stops the inverter to protect components including the power module.
- If a current exceeding 15A flows as shown in the diagram, the voltage at point Ⓐ detected by the detecation resistor is input to the positive ⊕ terminal of COM (2), and when it exceeds the voltage at the negative ⊖ terminal which is the set value, the output pin voltage (at point Ⓑ) of COM (2) goes "LO" → "HI". This turns Q303 on and stops the power module circuit via D4 and D2; also the voltage at point Ⓒ goes "HI" → "LO" and the Ip signal is supplied to pin ⑦① of the micro computer which stops the inverter.
- On the other hand, since the voltage at the positive ⊕ terminal is pulled up by R318, it is higher than the voltage at the negative ⊖ terminal even after the DC current becomes 0A and the voltage at point Ⓐ returns to 0V, therefore the output is temporarily kept at "Hi" (memory function).
- The micro computer sets pin ㉙ from "Hi" to "Lo" after the drive signal stops to release the memory function of COM (2) and return it to the initial state.

(2) Overload control circuit (OVL control circuit)

- Overload control is to decrease the speed of the compressor and reduce the load when the load on the air conditioner increases to an overload state, in order to protect the compressor, electronic components and power breaker.
- Overloads are judgement by comparing the DC current level and set value.
- Fig. 8-4 shows the overload control system configuration and Fig. 8-5 is a characteristic diagram of overload judgement values. There are two judgement methods-external judgement which compares the externally set value with the DC current value regardless of the rotation speed and internal judgement which compares the set value that varies according to the rotation speed programmed in the micro computer software with the DC current value.

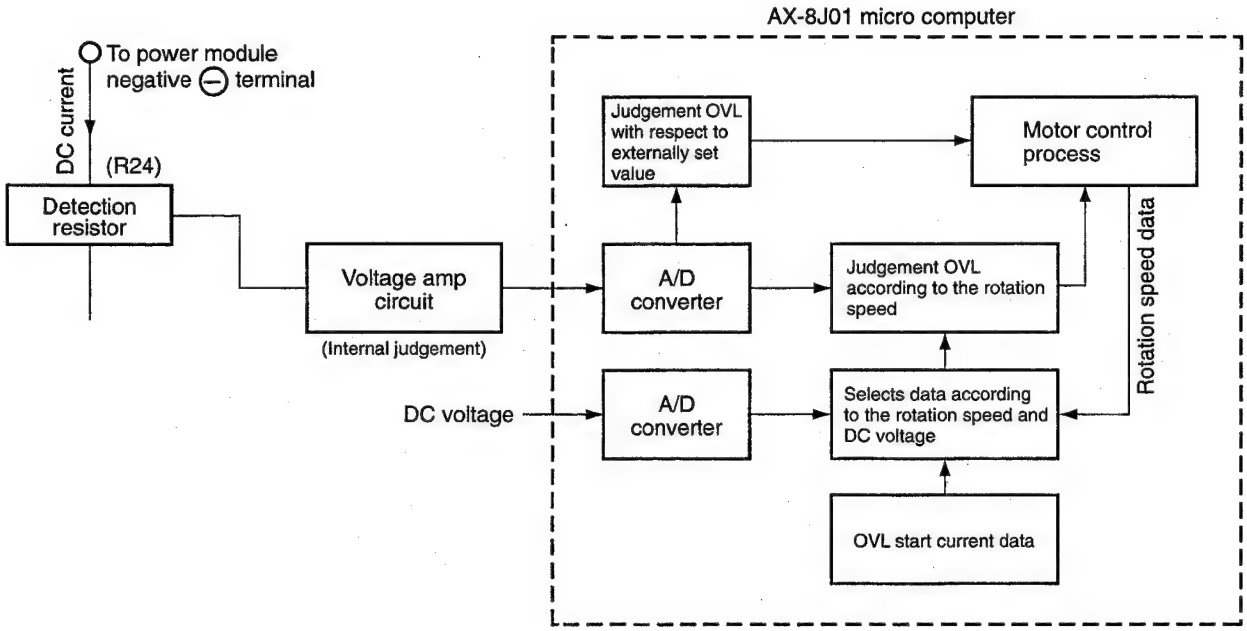


Fig. 8-4 Overload Control System Configuration

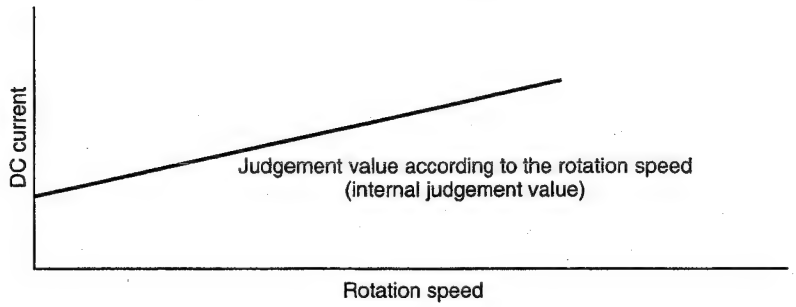


Fig. 8-5

①. Overload external judgement circuit

- The filter consisting of R2 and C515 removes high harmonic components from the voltage generated by the current flowing to Detection resistor; R2 and C501A average the voltage. This voltage is then input to OP1 pin ⑤ and amplified and is supplied to micro computer pin ⑥⓪. The micro computer compares this input with the internally set value, and if the input exceeds the set value, it enters overload control status.
- Fig. 8-7 shows the rotation speed control. When the voltage at pin ⑥⓪ of the micro computer exceeds the set value, the micro computer decreases the rotation speed of the compressor and reduces the load regardless of the rotation speed commanded by the indoor micro computer.

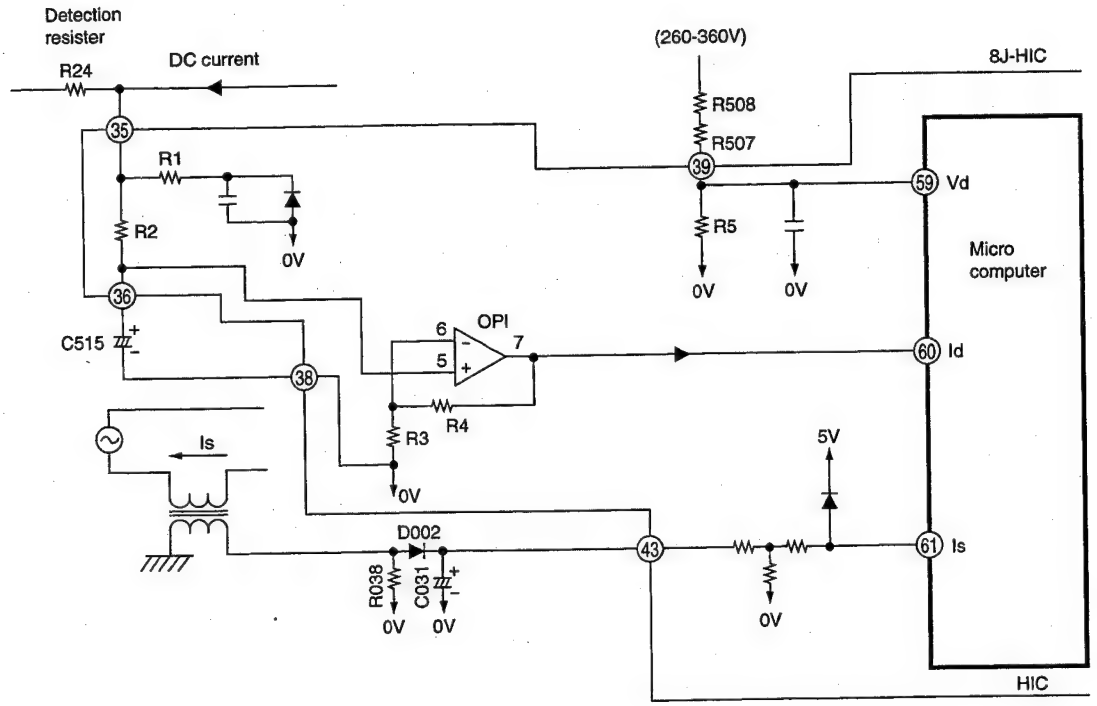


Fig. 8-6

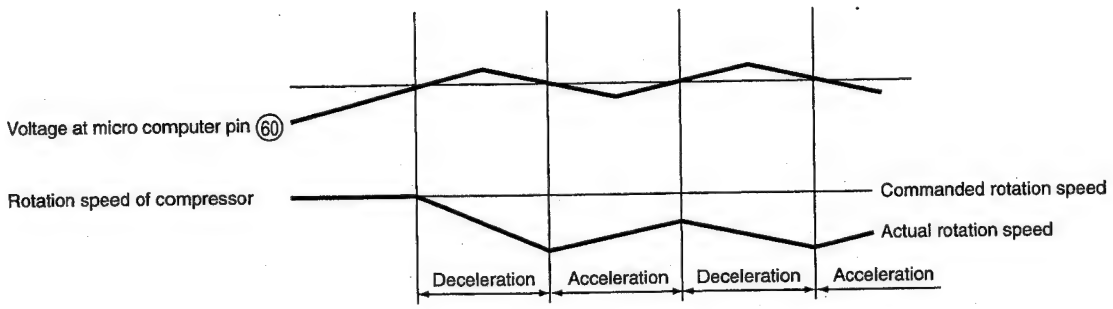


Fig. 8-7

②. Voltage amp. circuit

- The voltage amp. circuit amplifies the DC current level detected by the detection resistor after being converted to a voltage and supplies it to the micro computer. Receiving this, the micro computer converts it to a digital signal and compares it with the internal data to judge whether or not overload control is required.

< During overload control >

- The filter consisting of R2 and C515 removes high harmonic components from the voltage generated from the DC current flowing to the detection resistor, and supplies it to OP1 pin ⑤ OP1 forms a non-inverting voltage amp. circuit together with the peripheral elements.
- The micro computer stores the set values which vary sccording to the rotation speed. When the DC current level exceeds the set value, the micro computer enters the overload control state.
- The set Value is determined by the amplification of the voltage amp. circuit.

{ • Amplification : high → DC current : low
• Amplification : low → DC current: high

- R507, R508, R5 detect the DC voltage at the power circuit. The micro computer receives a DC voltage (260-380V) via HIC ㊴ and applies correction to the overload set value so the DC current is low (high) when the DC voltage is high (low).

  (Since the load level is indicated by the DC voltage multiplied by DC current, R229, R230, R231 are provided to perform the same overload judgement even when the voltage varies.)

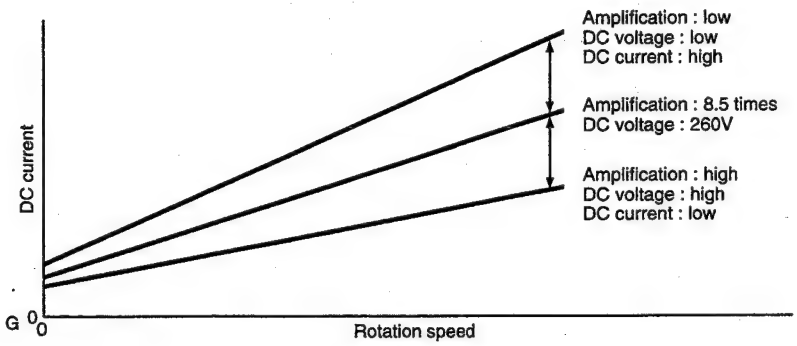


Fig. 8-8

< During start current control >

- It is required to maintain the start current (DC current) constant to smooth the start of the DC motor for the compressor.
- The RAC-25CNH2 uses software to control the start current.
- The start current varies when the supply voltage varies. This control method copes with variations in the voltages as follows.

  (1) Turns on the power module's U^+ and V^- transistors so the current flows to the motor windings as shown in Fig8-9.

  (2) Varies the turn-ON time of the W^+ transistor according to the DC voltage level and the start is controlled so the start current is approx. 10A as shown in Fig. 8-10.

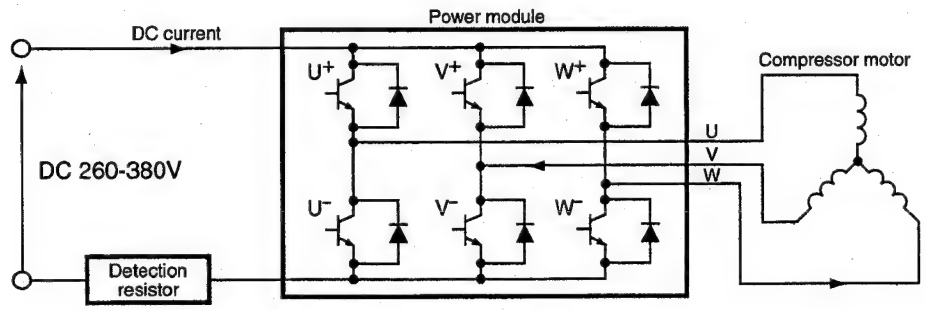


Fig. 8-9

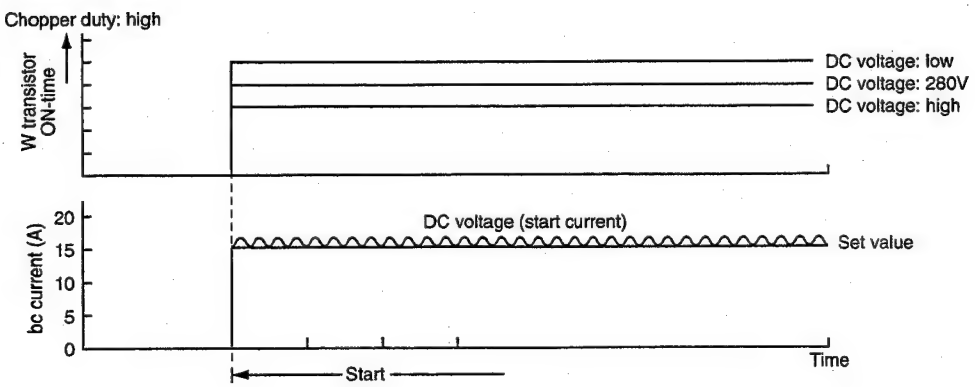


Fig. 8-10

9. Trip Signal Synthesis Circuit

- Fig. 9-1 shows the trip signal synthesis circuit.

  This circuit uses the upper and lower arm transistor drive signals to modulate the chopper signal or stops the drive signal, according to the presence or absence of the Ip cut signal and reset signal.

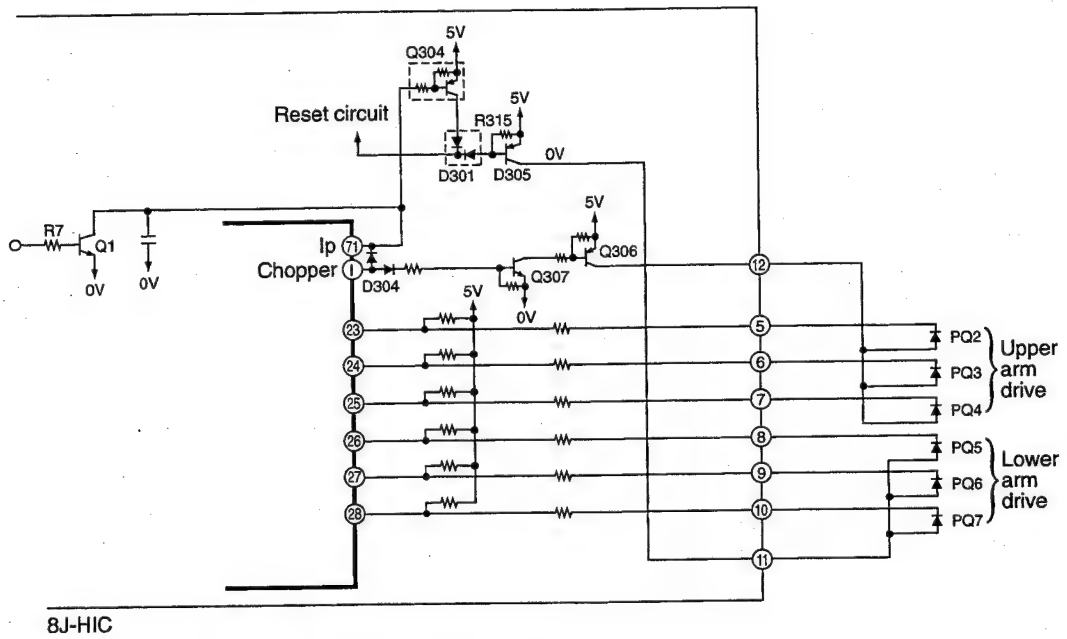


Fig. 9-1 Trip Signal Synthesis Circuit

- Table 9-1 shows the circuits to which the modulated signals are transferred.

  For example, the chopper signal is transferred only to the upper arm transistor drive circuit, and the reset signal is transferred to the microcomputer and upper and lower arm transistor drive circuits.

- Pins ㉓ ㉘ of the micro computer change from "Lo" to "Hi" alternately and supply signals to PQ2-PQ7.
- The chopper signal from the micro computer is inverted by Q307, and turns on or off PQ2-PQ4, to which voltage is supplied, with high frequencies, to let current flow to them to transfer the upper arm drive signal.
- When the reset voltage is "Lo", the current operating PQ5-P07 is stopped, and the lower arm transistor drive signal is turned off.
- The peak current cut off (Ip cut off) signal fixes the voltage at upper and lower arm drive circuits to "Lo" via D301 and D304, and turns off the drive signal in the same way as when the reset signal is "Lo".

Table 9-1 Circuits to which trip signals are transferred

Modulated signals \ Circuit	Microcomputer	Upper arm transistor drive circuit	Lower arm transistor drive circuit
Chopper signal	—	○	—
Start current limit signal	—	○	—
Peak current cut off signal	○	○	○
Reset signal	○	○	○

10. Temperature Detection Circuit

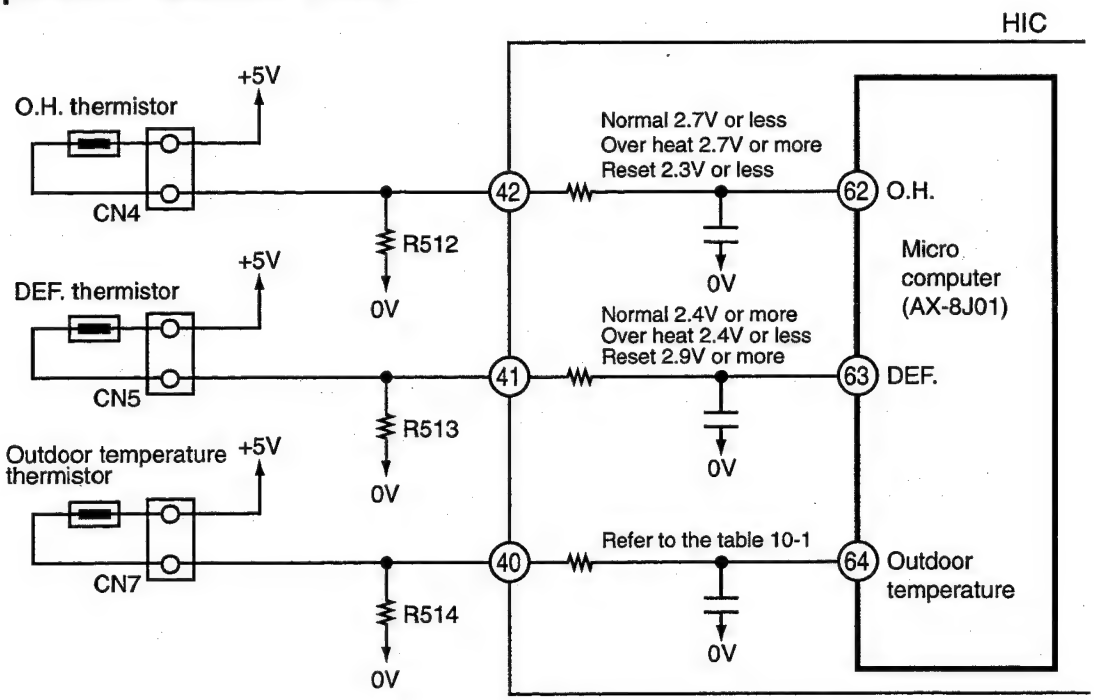


Fig. 10-1

- The Over heat thermistor circuit detects the temperature at the surface of the compressor head, the Defrost. thermistor circuit detects the defrosting operation temperature.
- A thermistor is a negative resistor element which has the characteristics that the higher (lower) the temperature, the lower (higher) the resistance.
- When the compressor is heated, the resistance of the Over heat thermistor becomes low and ⊕5V is divided by the over heat thermistor and R512 and the voltage at pin ⑫ of microcomputer.
- Microcomputer the voltage at pin ⑫ and the set value stored inside, and when it exceeds the set value, the microcomputer judges that the compressor is overheated and stops operation.
- When frost forms on the outdoor heat exchanger, the temperature at the exchanger drops abruptly.

  Therefore the resistance of the Defrost. thermistor becomes high and the voltage at pin ⑬ of microcomputer drops.

  If this voltage becomes lower than the set value stored inside, the micro computer starts defrosting control.
- During defrosting operation the micro computer transfers the defrosting condition command to the indoor microcomputer via the SDO pin IF transfer output of the interface.
- The microcomputer always reads the outdoor temperature via a thermistor (microcomputer pin ⑭ voltage), and transfers it to the indoor unit, thus controlling the compressor rotation speed according to the value set at the EEPROM in the indoor unit, and switching the operation status (outdoor fan on/off, etc.) in the dry mode.

  The following shows the typical values of outdoor temperature in relation to the voltage:

Table 10-1

Outdoor temperature (°C)	-10	0	10	20	30	40
Microcomputer pin ⑭ voltage (V)	1.19	1.69	2.23	2.75	3.22	3.62

<Reference>

When the thermistor is open, in open status, or is disconnected, microcomputer pins ⑫ - ⑭ are approx. 0V; when the thermistor is shorted, they are approx. 5 V, and LD301 blinks seven times.

However, an error is detected only when the OH thermistor is shorted; in such a case, the blinking mode is entered 12 minutes after the compressor starts operation.

11. Reset Circuit

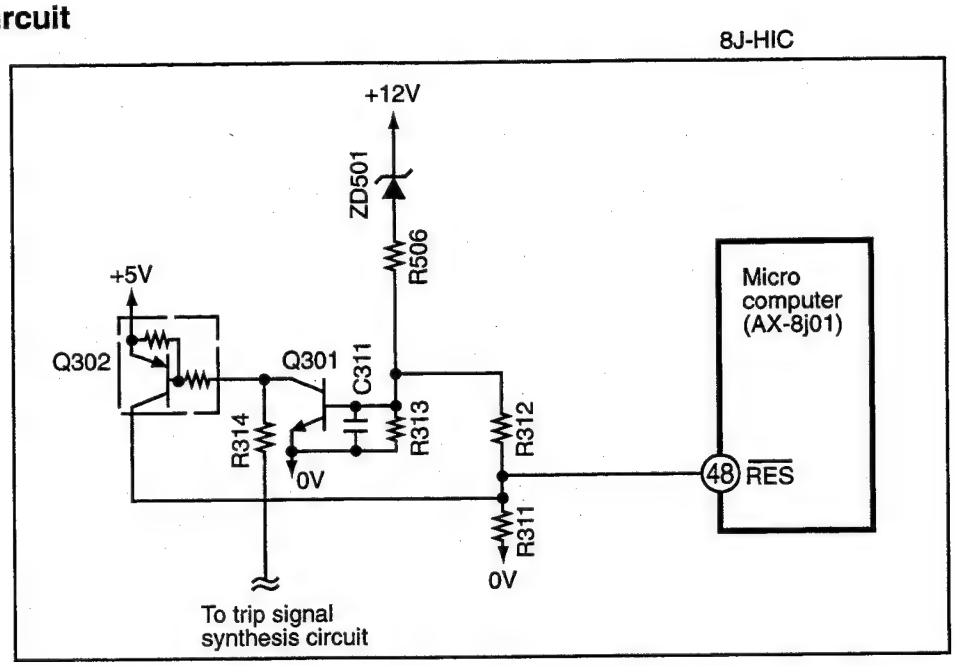


Fig. 11-1

- Reset circuit performs initial setting of the microcomputer program before power is turned on.
- Microcomputer resets program with reset voltage set to Lo, and program can be operated with Hi.
- Fig. 11-1 shows the reset circuit and Fig. 11-2 shows waveform at each point when power is turned on and off.
- When power is turned on, 12V line and 5V line voltages rise and 12V line voltage reaches 7.2V (Zenor voltage of ZD501), D501 is turned ON, Q301 and 0302 are turned ON and reset voltage input to pin ㊽ of microcomputer is set to Hi. By ZD501, reset voltage maintains input of pin ㊽ at Lo until Vdd of microcomputer rises to 5V to obtain operable status.
- When power is shut off and potential of 12V is lowered, ZD501 is shifted to OFF. However, since reset voltage is feed back to Q301 by R312, maintains ON state until 12V line voltage drops to about 7.6V. This prevents reset voltage from chattering due to voltage change in 12V line.

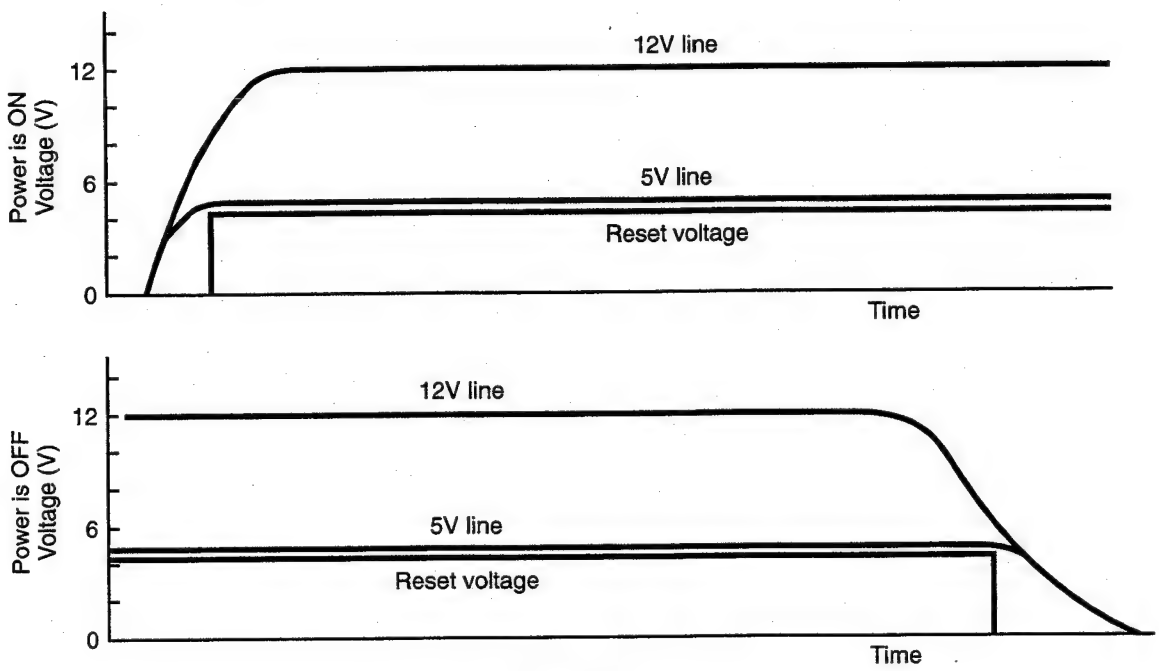


Fig. 11-2

SERVICE CALL Q & A

Model RAS-25CNH2
RAC-25CNH2

COOLING MODE

Q1 The compressor has stopped suddenly during cooling operation.

A1 Check if the indoor heat exchanger is frosted. Wait for 3-4 minutes until it is defrosted.

If the air conditioner operates in cooling mode when it is cold, the evaporator may get frosted.

DEHUMDIFYING MODE

Q2 Sound of running water is head from indoor unit during dehumdifying.

A2 Normal sound when refrigerant flows in pipe.

Q3 Compressor occasionally does not operate during dehumidifying.

A3 Compressor may not operate when room temperature is 10°C or less. It also stops when the humidity is preset humidity or less.

HEATING MODE

Q4 The circulation stops occasionally during Heating mode.

A4 It occurs during defrosting. Wait for 5-10 minutes until the condenser is defrosted.

Q5 When the fan speed is set at HIGH or MED, the flow is actually Weak.

A5 At the beginning of heating, the fan speed remains LOW for 30 seconds. If HIGH is selected, it switches to LOW and again to MED after additional 30 seconds.

Q6 Heating operation stops while the temperature is preset at "30".

A6 If temperature is high in the outdoor, heating operation may stop to protect internal devices.

AUTO FRESH DEFROSTING

Q7 After the ON/OFF button is pressed to stop heating, the outdoor unit is still working with the OPERATION lamp lighting.

A7 Auto Fresh Defrosting is carried out : the system checks the outdoor heat exchanger and defrosts it as necessary before stopping operation.

AUTO OPERATION

Q8 Fan speed does not change when fan speed selector is changed during auto operation.

A8 At this point fan speed is automatic.

NICE TEMPERATURE RESERVATION

Q9 When on-timer has been programmed operation starts before the preset time has been reached.

A9 This is because "Nice temperature reservation" function is operating. This function starts operation earlier so the preset temperature is reached at the preset time. Operation may start maximum 60 minutes before the preset time.

Q10 Does "Nice temperature reservation" function operate during dehumidifying?

A10 It does not work. It works only during cooling and heating.

Q11 Even if the same time is preset, the operation start time varies.

A11 This is because "Nice temperature reservation" function is operating. The start time varies according to the load of room. Since load varies greatly during heating, the operation start time is corrected, so it will vary each day.

INFRARED REMOTE CONTROL

Q12 Timer cannot be set.

A12 Has the clock been set? Timer cannot be set unless the clock has been set.

Q13 The current time display disappears soon.

A13 The current time disappears in approx. 10 seconds. The time set display has priority.

When the current time is set the display flashes for approx 3 minutes.

Q14 The timer has been programmed, but the preset time disappears.

A14 Is the current time past the preset time? When the preset time reaches the current time, it disappears.

OTHERS

Q15 The indoor fan varies among high air flow, low air flow and breeze in the auto fan speed mode. (Heating operation)

A15 This is because the cool wind prevention function is operating, and does not indicate a fault.

The heat exchanger temperature is sensed in the auto speed mode. When the temperature is low, the fan speed varies among high air flow, low air flow and breeze.

Q16 Loud noise from the outdoor unit is heard when operation is started.

A16 When operation is started, the compressor rotation speed goes to maximum to increase the heating or cooling capability, so noise becomes slightly louder. This does not indicate a fault.

Q17 Noise from the outdoor unit occasionally changes.

A17 The compressor rotation speed changes according to the difference between the thermostst set temperature and room temperature. This does not indicate a fault.

Q18 There is a difference between the set temperature and room temperature.

A18 There may be a difference between the set temperature and room temperature because of construction of room, air current, etc. Set the temperature at a comfortable for the space.

Q19 Air does not flow immediately after operation is started.

A19 Preliminary operation is performed for one minute when the power switch on and heating or dehumidifying is set. The operation lamp blinks during this time for heating. This does not indicate a fault.

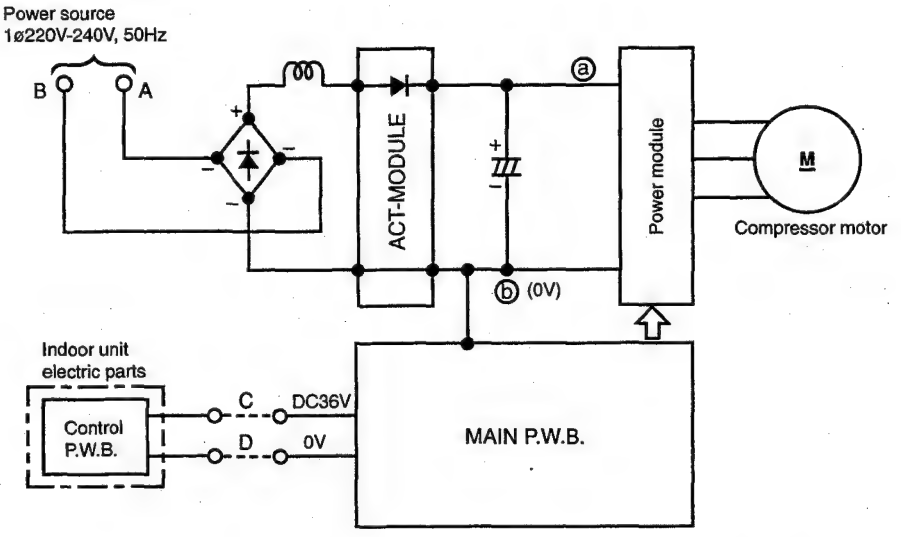
TROUBLE SHOOTING

Model RAS-25CNH2 / RAC-25CNH2

PRECAUTIONS FOR CHECKING

DANGER

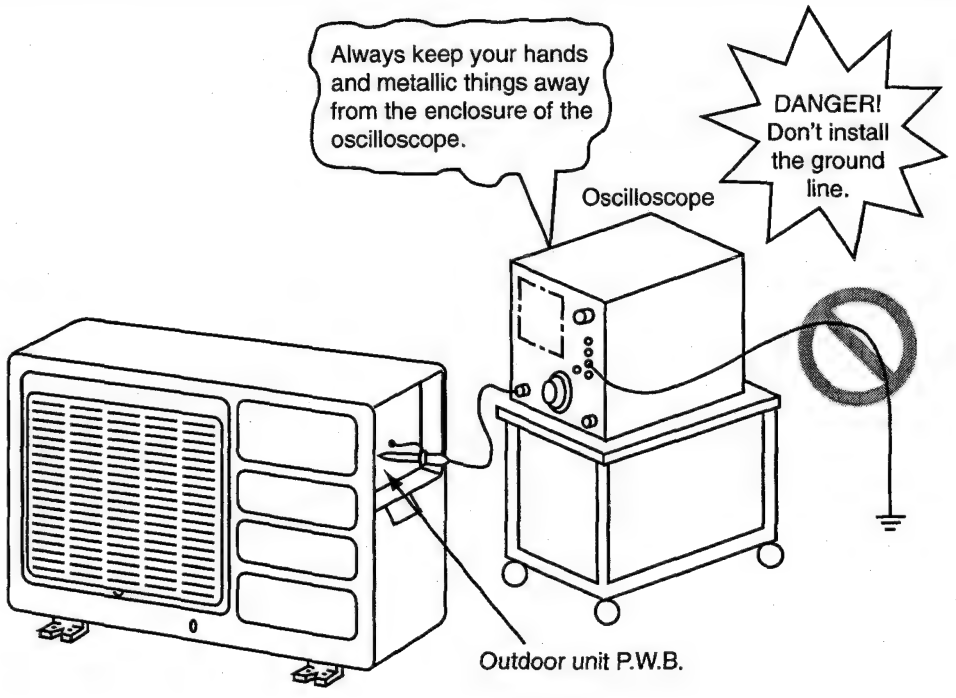
1. Remenber that the 0V line is biased to 155-170V in reference to the ground level.
2. Also note that it takes about 10 minutes until the voltage fall after the power switch is turned off.



Across ⓐ – ⓑ (0V line)..... approx 260-380V
Across ⓐ – ground..... approx 155-170V
Across ⓑ (0V line)– ground..... approx 155-170V

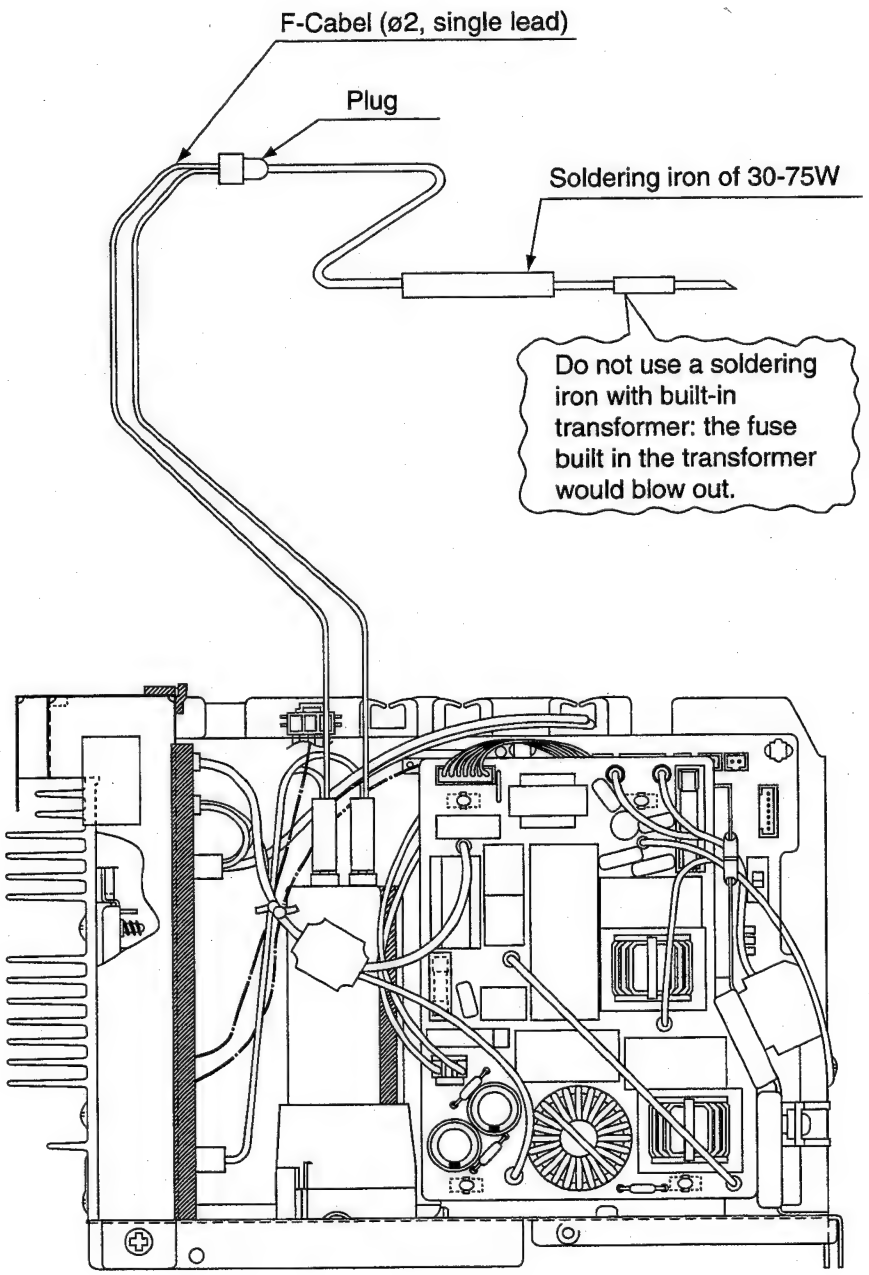
DANGER

When using an oscilloscope, never ground it. Don't forget that high voltages as noted above may apply to the oscilloscope.



- The smoothing capacitor (740 µF) are charged with 260-380V.
- Don't forget to discharge them before attempting access to electric parts.

1. Turn off the power switch of the indoor unit or unplug its power cord from the AC outlet.
2. After turning power switch off, wait for at least 10 minutes, and then remove the electrical unit cover. Fit a 30-75 W soldering iron to the receptacles of white and black lead wires on the smoothing capacitor for at least 15 seconds, to discharge the voltage at the smoothing capacitor.



CHECKING THE INDOOR/OUTDOOR UNIT ELECTRICAL PARTS AND REFRIGERATING CYCLE

[MODEL RAS-40CNH1/RAC-40CNH1, RAS-50CNH1/RAC-50CNH1]

Does the timer or dehumidifying lamp on the indoor unit blink?

Timer lamp → See "Troubleshooting when the timer lamp blinks".

Check the outdoor electrical parts.

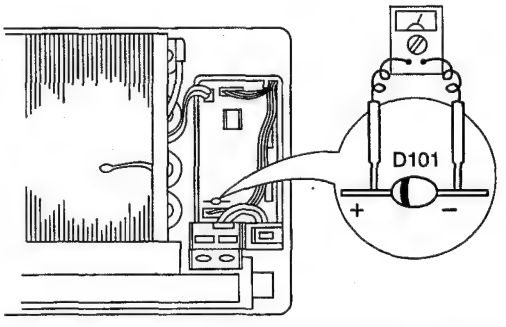
No

Set to room temperature 16°C in the cooling mode or to 32°C in the heating mode, and press the start/stop button.

Dehumidifying lamp

Does the operation lamp on the indoor unit start to light or blink?

No → Remove the decorative cover and electrical parts cover and check the pin voltages of CN3 (brown and red wires).
Pin ⑤: +39 V, pin ③: 0V



Is approx. 3V DC being generated? Is the polarity correct?

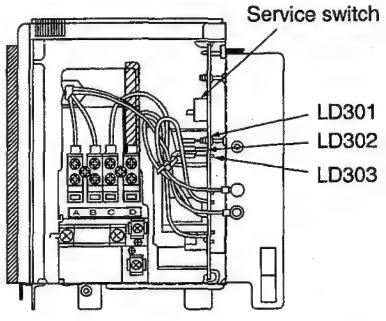
Yes

Is the compressor in the outdoor unit operating?

Yes

No

Remove the outdoor unit cover and electrical parts cover, and check self-diagnosis lamp LD301.



Does LD301 blink one time?
* Repeats 0.25-second on and 2-second off.

No

Check to see whether the F-cable is connected incorrectly or disconnected.

Normal

Yes

Blinking other than one-time

One-time blinking

Set the service switch on the outdoor unit to "cooling". Does the compressor operate? (After checking, be sure to return the service switch to "normal".)

Yes

No

See "Outdoor unit self-diagnosis lamp lighting mode".

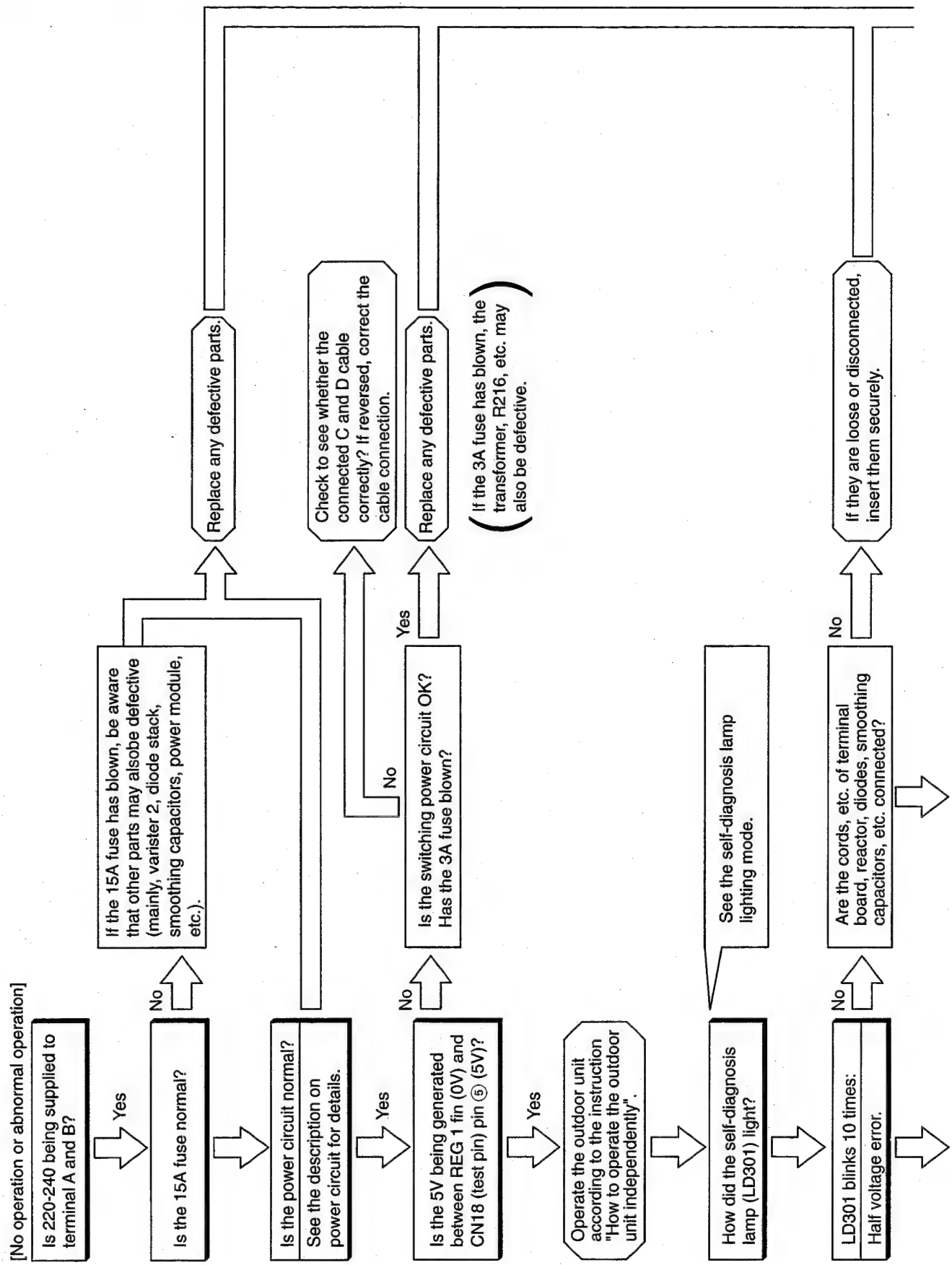
Check the refrigerating cycle.

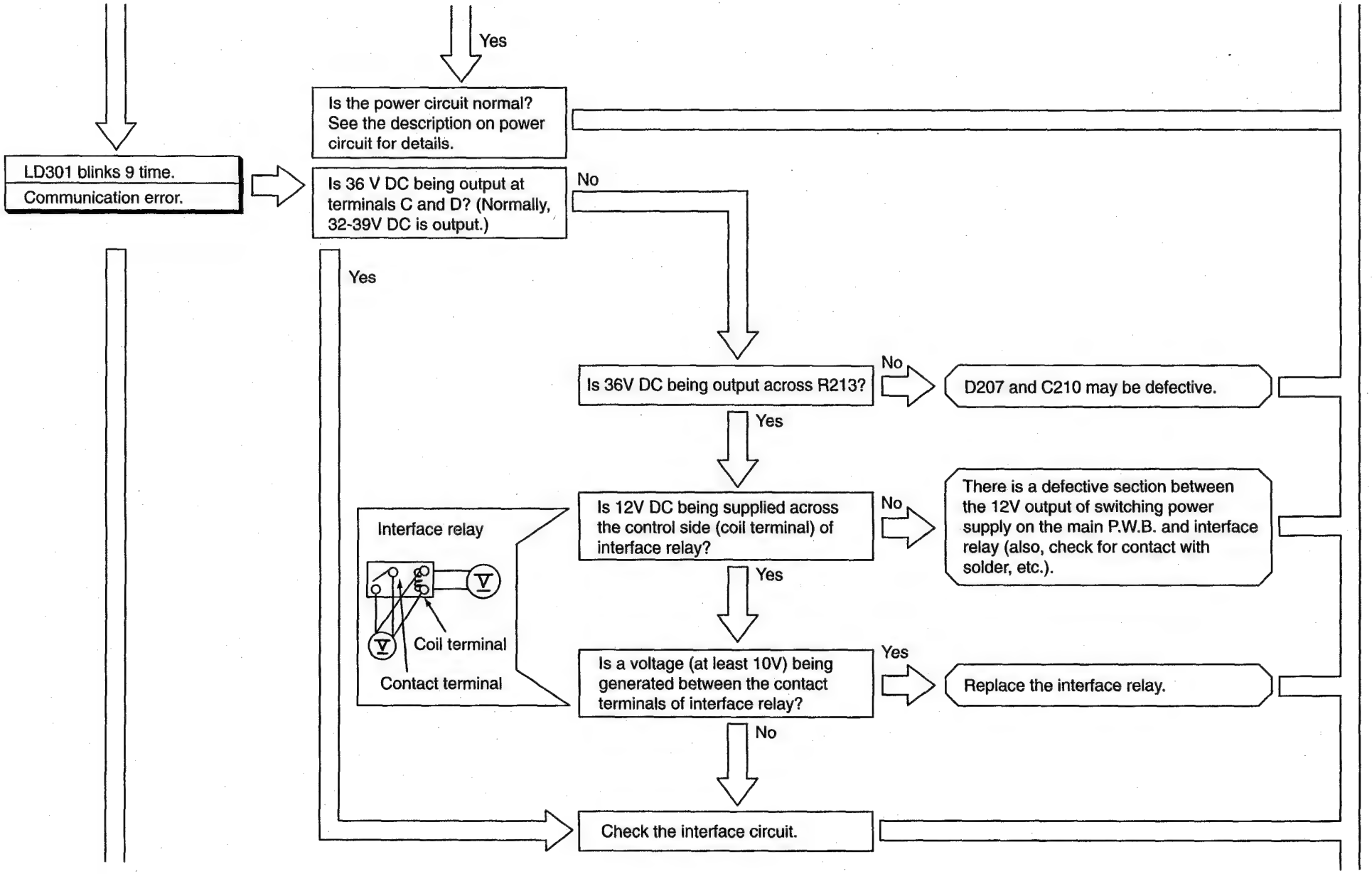
Check the outdoor electrical parts.

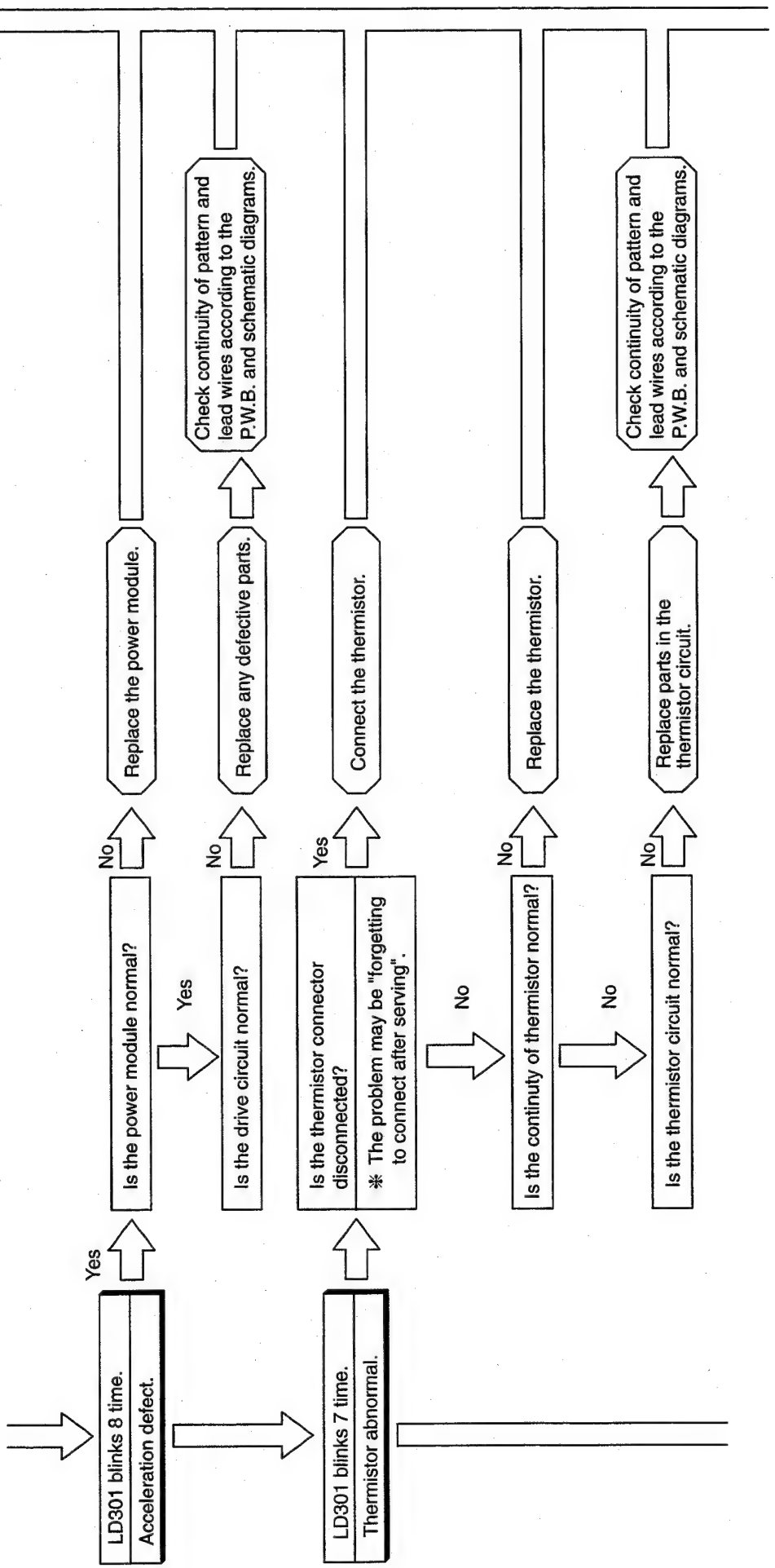
Check the indoor electrical parts.

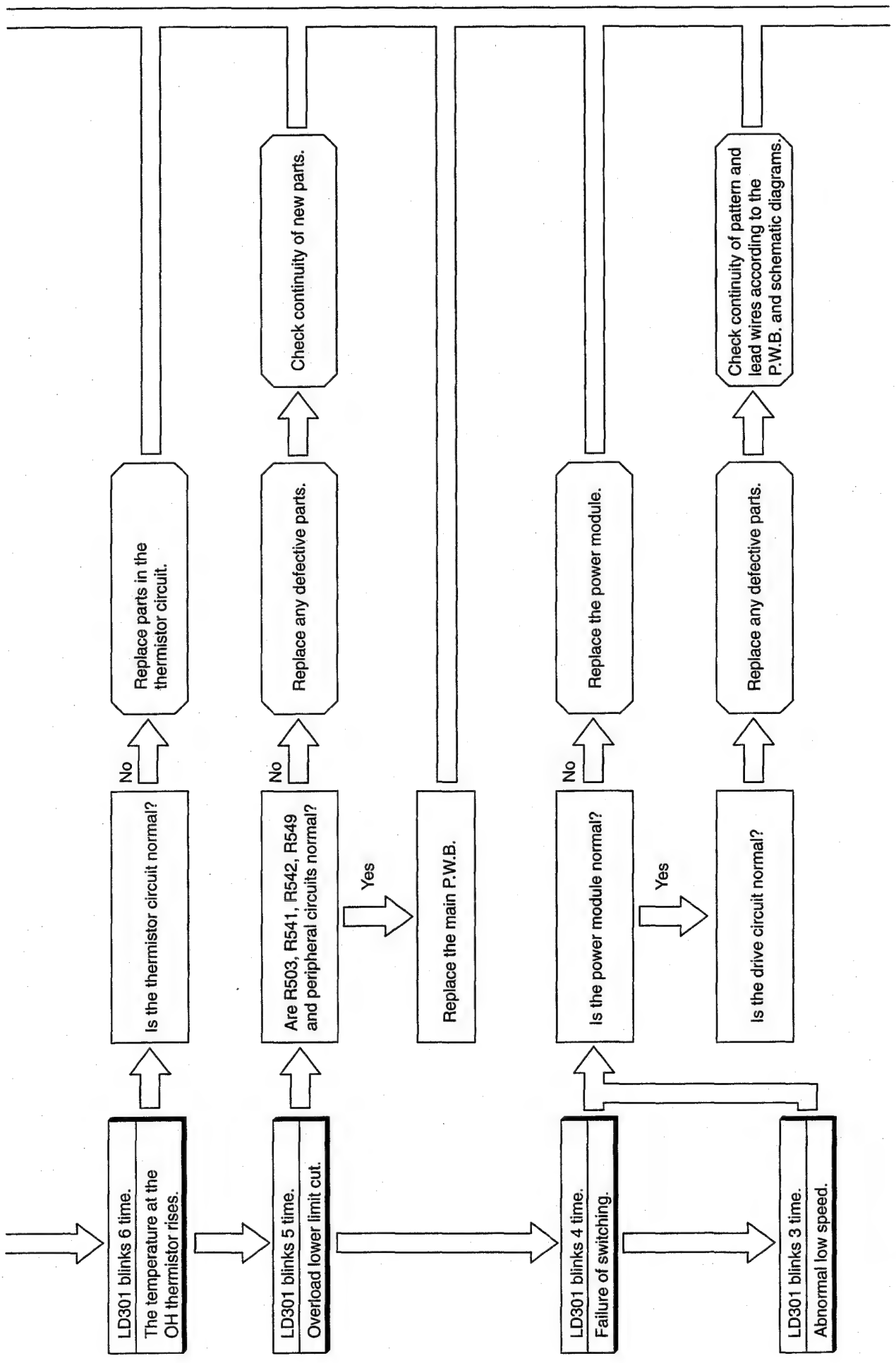
CHECKING THE OUTDOOR UNIT ELECTRICAL PARTS

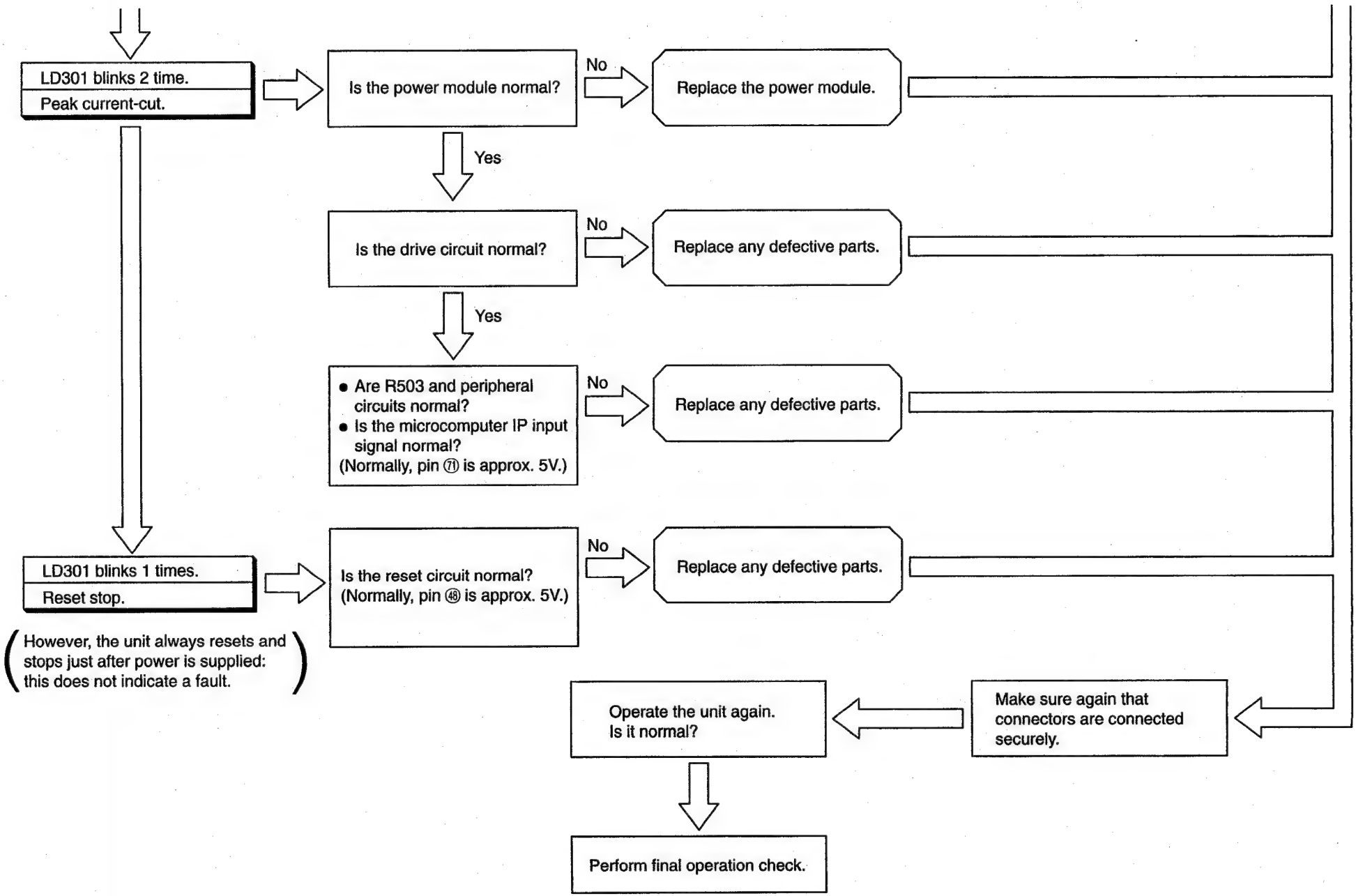
MODEL RAC-25CNH2




LD301 blinks 9 time.
Communication error.
Yes
Is the power circuit normal? See the description on power circuit for details.
Is 36 V DC being output at terminals C and D? (Normally, 32-39V DC is output.)
No
Yes
Is 36V DC being output across R213?
No
D207 and C210 may be defective.
Yes
Interface relay
Is 12V DC being supplied across the control side (coil terminal) of interface relay?
No
There is a defective section between the 12V output of switching power supply on the main P.W.B. and interface relay (also, check for contact with solder, etc.).
Yes
Coil terminal
Contact terminal
Is a voltage (at least 10V) being generated between the contact terminals of interface relay?
Yes
Replace the interface relay.
No
Check the interface circuit.

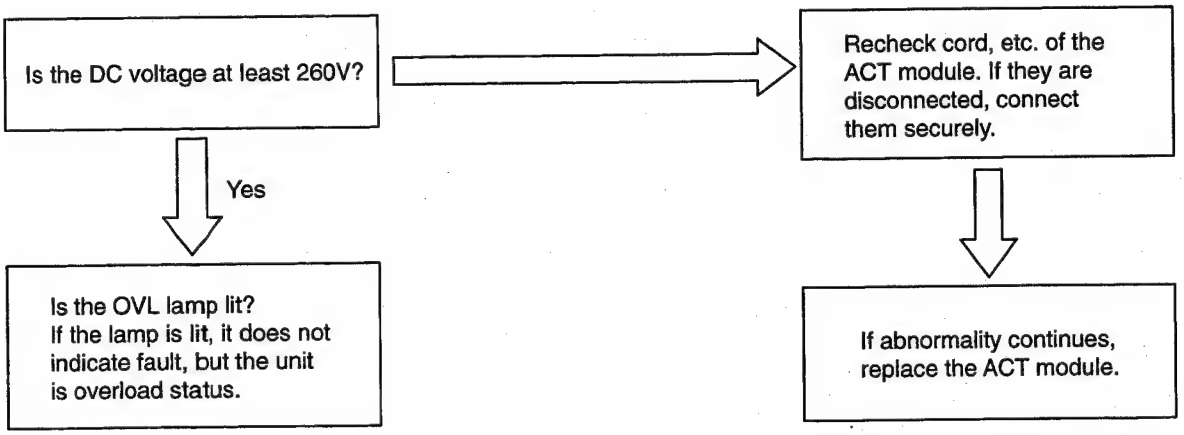

LD301 blinks 8 time.
Acceleration defect.
Yes
Is the power module normal?
No
Replace the power module.
Yes
Is the drive circuit normal?
No
Replace any defective parts.
Check continuity of pattern and lead wires according to the P.W.B. and schematic diagrams.
LD301 blinks 7 time.
Thermistor abnormal.
Yes
Is the thermistor connector disconnected?
* The problem may be "forgetting to connect after serving".
Connect the thermistor.
No
Is the continuty of thermistor normal?
No
Replace the thermistor.
No
Is the thermistor circuit normal?
No
Replace parts in the thermistor circuit.
Check continuity of pattern and lead wires according to the P.W.B. and schematic diagrams.


LD301 blinks 6 time.
The temperature at the OH thermistor rises.
Is the thermistor circuit normal?
No
Replace parts in the thermistor circuit.
LD301 blinks 5 time.
Overload lower limit cut.
Are R503, R541, R542, R549 and peripheral circuits normal?
No
Replace any defective parts.
Check continuity of new parts.
Yes
Replace the main P.W.B.
LD301 blinks 4 time.
Failure of switching.
Is the power module normal?
No
Replace the power module.
Yes
Is the drive circuit normal?
No
Replace any defective parts.
Check continuity of pattern and lead wires according to the P.W.B. and schematic diagrams.
LD301 blinks 3 time.
Abnormal low speed.


LD301 blinks 2 time.
Peak current-cut.
Is the power module normal?
No
Replace the power module.
Yes
Is the drive circuit normal?
No
Replace any defective parts.
Yes
• Are R503 and peripheral circuits normal?
• Is the microcomputer IP input signal normal?
(Normally, pin ⑦① is approx. 5V.)
No
Replace any defective parts.
LD301 blinks 1 times.
Reset stop.
(However, the unit always resets and stops just after power is supplied: this does not indicate a fault.)
Is the reset circuit normal?
(Normally, pin ④⑧ is approx. 5V.)
No
Replace any defective parts.
Make sure again that connectors are connected securely.
Operate the unit again.
Is it normal?
Perform final operation check.

PAM (POWER ACTIVE MODULE) CIRCUIT

Phenomenon 1 <Rotation speed does not increase>



Ocervoltage defect: ACT module faulty
(15-times blinking)

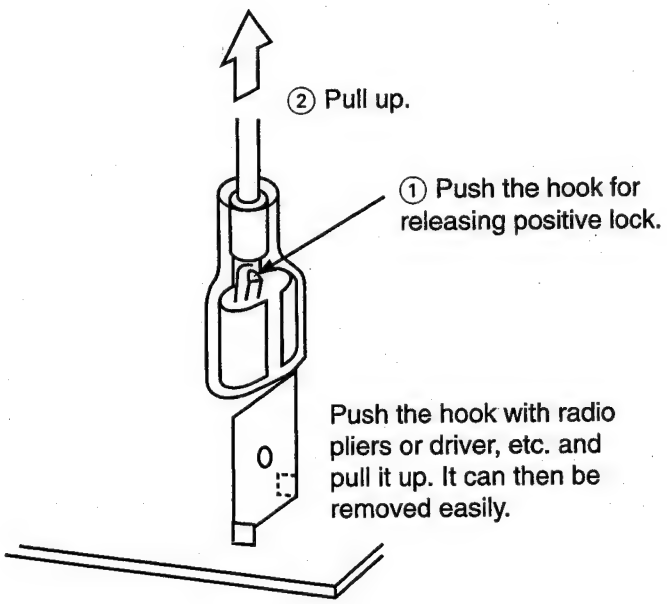
Removing the ACT module:

1. Disconnect the connector and remove the 8 receptacles.

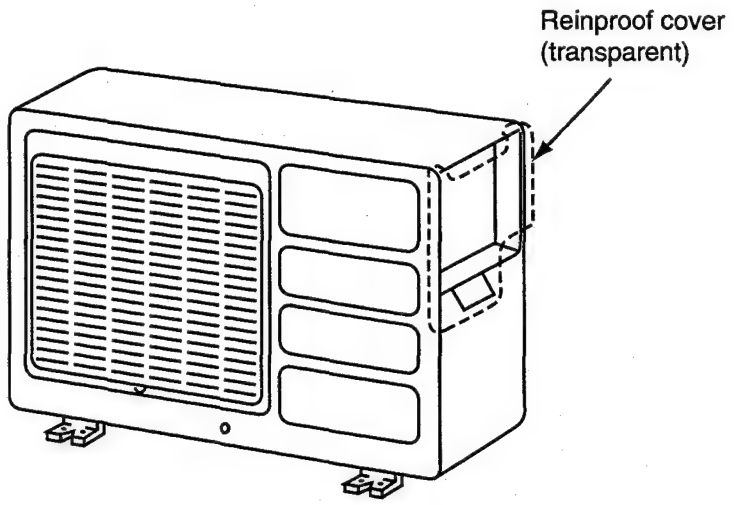
< Caution >

The resin sleeve can be removed by pulling it up, but the PVC sleeve or receptacle without sleeve cannot be removed this way; remove it by the procedure on the right. (It cannot be removed unless the positive lock is released.) Do not pull or lift it forcibly: this could break PWB or terminals.

2. Remove the 2 (M3) screws.

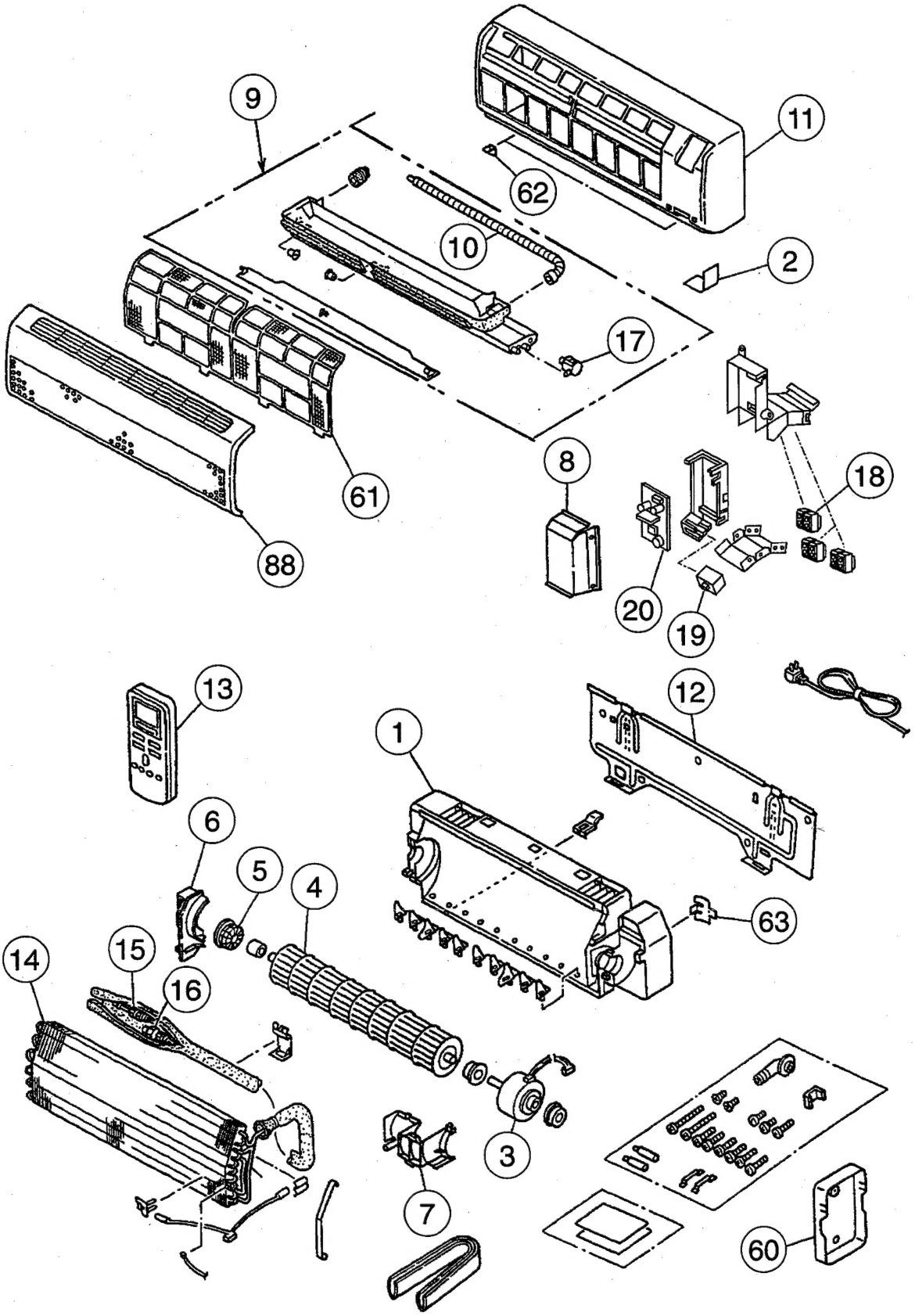


Be sure to replace the rainproof cover after checking (rainwater would enter if it is not installed).



PARTS LIST AND DIAGRAM

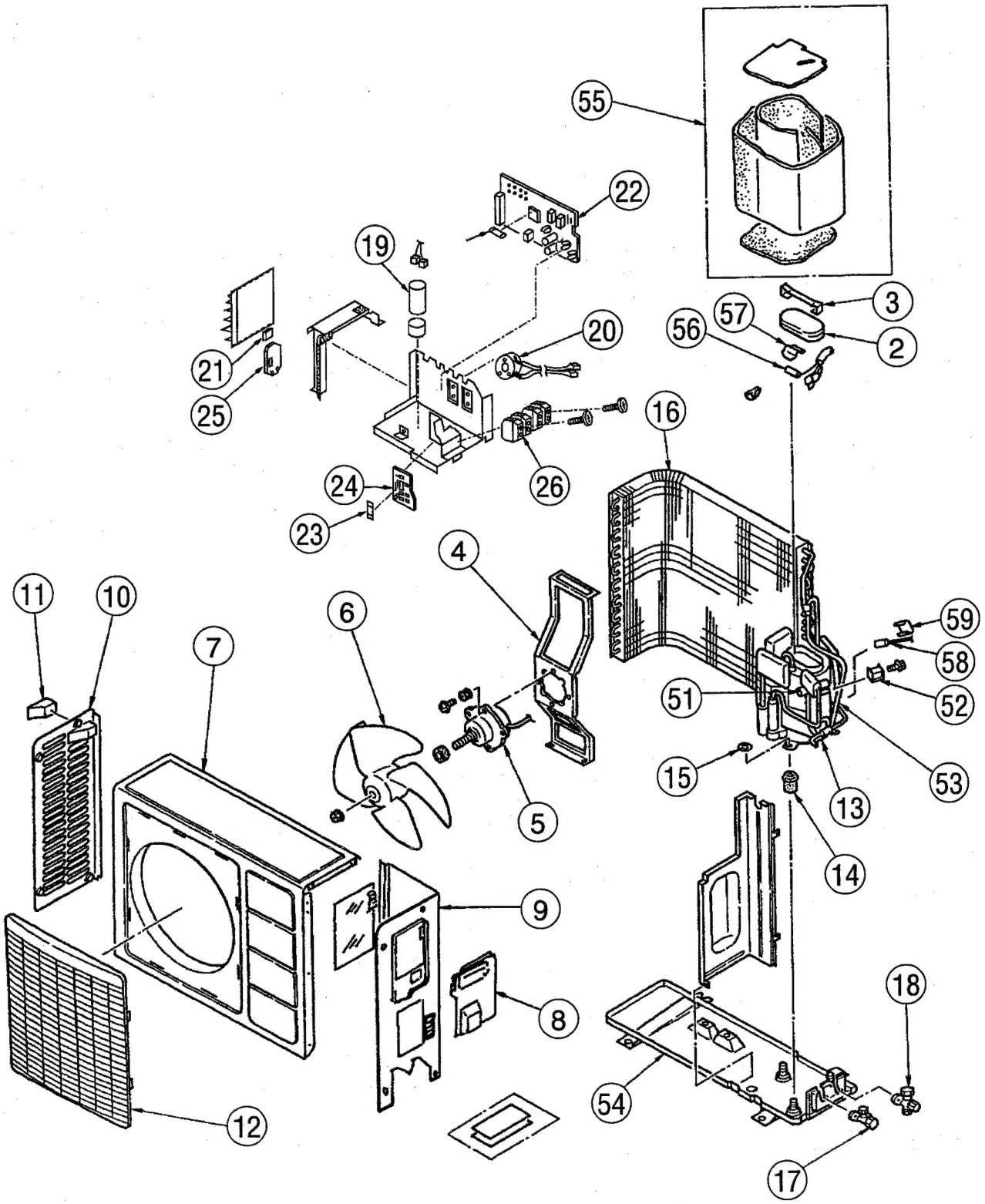
MODEL RAS-5CNH2



MODEL RAS-25CNH2

NO.	PART N0. RAS-25CNH2	Q'TY / UNIT	PARTS NAME
1	PMRAS-25CNH2 001	1	CABINET
2	PMRAS-25CNH2 002	1	LOW-COVER
3	PMRAS-25CNH2 003	1	20W MOTOR
4	PMRAS-25CNH2 004	1	TANGENTIAL FLOW FAN
5	PMRAS-25CNH2 005	1	P-BEA ASSEMBLY
6	PMRAS-25CNH2 006	1	BEARING COVER
7	PMRAS-25CNH2 007	1	FAN MOTOR SUPPORT
8	PMRAS-25CNH2 008	1	ELECTRICAL COVER
9	PMRAS-25CNH2 009	1	DRAIN PAN ASSEMBLY
10	PMRAS-25CNH2 010	1	DRAIN HOSE
11	PMRAS-25CNH2 011	1	FRONT COVER ASS'Y
12	PMRAS-25CNH2 012	1	MOUNTING PLATE
13	PMRAS-25CNH2 013	1	REMOTE CONTROL
14	PMRAS-25CNH2 014	3	EVAPORATOR
15	PMRAS-25CNH2 015	3	UNION (2)
16	PMRAS-5100C 017	1	UNION (3)
17	PMRAS-25CNH2 016	1	STEP MOTOR
60	PMRAS-25CNH2 017	1	REMOTE CONTROL HOLDER
61	PMRAS-25CNH2 018	1	FILTER
62	PMRAS-25CNH2 019	2	CAP
63	PMRAS-25CNH2 020	1	PIPE SUPPORT
18	PMRAS-07C1 006	3	TERMINAL BOARD (2P)
19	PMRAS-25CNH2 021	1	SWITCH (POWER)
20	PMRAS-25CNH2 022	1	P.W.B. (MAIN)
21	PMRAS-25CNH2 023	1	THERM-FUSE
22	PMRAS-25CNH2 024	1	THERMISTOR

MODEL RAC-5CNH2



MODEL RAC-25CNH2

NO.	PART N0. RAC-25CNH2	Q'TY / UNIT	PARTS NAME
2	RA-226 015	1	O.L.R. COVER
3	RA-226 016	1	COVER SUPPORT
4	PMRAC-05CV 901	1	FAN MOTOR SUPPORT
5	PMRAC-25CNH2 901	1	20W MOTOR
6	PMRAC-25CNH2 902	1	PROPELLER FAN
7	PMRAC-25CNH2 903	1	CABINET
8	PMRAC-05CV 905	1	ELECTRICAL COVER ASSEMBLY
9	PMRAC-05CV 906	1	SIDE PLATE (R)
10	PMRAC-05CV 907	1	SIDE PLATE (L)
11	PMRAC-05CV 908	1	HANDLE
12	PMRAC-05CV 909	1	GRILL
13	PMRAC-25CNH2 904	1	INVERTER COMPRESSOR
14	RAC-2226HV 805	3	COMPRESSOR RUBBER
15	KPNT1 001	3	PUST NUT
16	PMRAC-25CNH2 905	1	CONDENSER
17	PMRAC-07CHV1 904	1	2S-VALVE
18	PMRAC-05CV 914	1	3S-VALVE
51	PMRAC-07CHV1 920	1	REVERSING VALVE
52	PMRAC-07CHV1 921	1	COIL (REVERSING VALVE)
53	PMRAC-07CHV1 922	1	CHECK VALVE
54	PMRAC-25CNH2 906	1	BASE
55	PMRAC-25CNH2 907	1	SILENT COVER
56	PMRAC-25CNH2 908	1	THERMISTOR (OH)
57	PMRAC-25CNH2 909	1	THERMISTOR (OH) SUPPORT
58	PMRAC-25CNH2 910	1	THERMISTOR
59	PMRAC-25CNH2 911	1	THERMISTOR SUPPORT
19	PMRAC-25CNH2 912	1	SMOOTHING CAPACITOR
20	PMRAC-25CNH2 913	1	COIL ASSEMBLY
21	PMRAC-25CNH2 914	1	DIODE STACK
22	PMRAC-25CNH2 915	1	P.W.B. (MAIN)
23	PMRAS-5100C 013	2	FUSE
24	PMRAC-25CNH2 916	1	P.W.B. (POWER)
25	PMRAC-25CNH2 917	1	ACTIVE MODULE
26	PMRAS-07C1 006	2	TERMINAL BOARD (2P)